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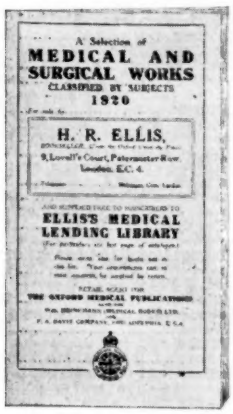

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LECTURE II.*—WAR FLYING AT HIGH ALTITUDES.

Delivered on March 11th, 1920.

IN the last lecture I had occasion to refer to exposure to high altitudes as a factor in shortening the flying officer's period of efficiency and accelerating the onset of fatigue. To-day I propose to consider the very difficult and important question of altitude in detail, fully realising that it entails a journey into the sphere of pure physiology and a consideration of highly technical data, to express my own opinion on which would certainly savour of presumption. I shall, therefore, attempt first to present the actual facts as observed, and, secondly, to discuss, and if possible interpret, them on as broad a basis as possible. And here it is as well to realise that the great development of the powers of the aeroplane has provided a remarkable example of the value of what is sometimes termed "academic" research—that is to say, of investigations which at the time they are made appear to have little applicability to the problems of the present, or even of the immediate future. It was, in fact, exactly 40 years before flying at high altitudes became practicable that the physiological principles involved had been definitely established by the masterly researches of Paul Bert.[1]

THE GROWTH OF FLYING.

It was not until the closing months of 1916 that our thoughts were directed towards the subject of this lecture. At that time, however, a machine made its appearance in the field which was capable of reaching an altitude of nearly 20,000 ft. I well remember hastening down to the aerodrome where this new prodigy was on view and interviewing an extremely small person whose diminutive stature and boyish demeanour belied his proud claim to having attained military age. He had only a few minutes previously landed from an altitude of 18,000 ft., where he had been engaged in the novel experience of testing his marksmanship on an enemy balloon which had drifted many miles over our lines. The fact that he had not succeeded in hitting this enormous target failed both to depress him and to impress me. Except for admitting that he had felt "lonely and cold up there," he protested complete ignorance of any untoward symptoms, and appeared refreshed rather than fatigued by his experience. Shortly afterwards, however, I had occasion to visit a squadron where I found a very different state of affairs. This unit had been employed for the past two months on patrols at 15,000 to 17,000 ft., and the effects of altitude had become, unprompted from any medical source, a subject for discussion in the mess. All the pilots were agreed that the work was very fatiguing, and except for a certain degree of dyspnœa in the air the chief effects were felt after landing, the most usual symptom being frontal headache.

It was therefore clear that a new problem had arisen which the science of medicine would have to help to solve. To what extent matters in this direction would develop was a matter of conjecture, but that it would necessarily be limited was early apparent, since the internal combustion engine was likely to suffer as much from oxygen-want as the occupant of the machine which it propelled.

THE MILITARY ASPECTS OF HEIGHT.

Apart from its adverse effects on the human organism superiority in altitude confers definite tactical advantages. It enables the pilot to get beyond the reach of his opponent, and in this happy and secure position to reconnoitre at his leisure, or to reach the objective to be bombed, and to return with a minimum of interference from the enemy. During the war the advantage for reconnaissance was definitely realised, that for bombing, however, only imperfectly. The latter was clearly sought after by the enemy in his raids on England, since all the later machines employed for this purpose were equipped with oxygen apparatus. But the most important advantage which altitude conferred was undoubtedly that connected with fighting in the air. An aerial combat between modern scout machines is, as a rule, a matter of seconds rather than minutes, and the advantage of initial speed in attack is inestimable. Superiority in height confers this advantage by enabling the pilot to dive on his opponent. It was for this reason that it seemed essential for fighting machines to be capable of attaining great and still greater altitudes without at the same time losing so much engine-power as to render them unairworthy and devoid of manœuvrability.

These mechanical considerations were profoundly modified in practice, since the purely mechanical advantages of height were in great measure counterbalanced by its physiological disadvantages. I think I should be fairly correct in stating that in 1918 all purely fighting machines had a "ceiling" of at least 20,000 ft., and equally correct in estimating the decisive combats at this altitude at less than 1 per cent., and those above 15,000 ft. at less than 20 per cent., of all that took place. This discrepancy was not due to the fact that machines did not fly at the higher altitudes, but was largely, although not entirely, attributable to a great many factors of a purely military nature which cannot be discussed here. Fighting pilots, in fact, came to look upon the advantage of altitude as one not to be lightly thrown away, but, at the same time, as one which under certain circumstances might be dispensed with. The decision as to which course to pursue rested largely with the fighting qualities of the machine, and where a pilot was confident of superiority in this respect he was often prepared to discard the dubious advantages of height. Towards the end of the war the physiological effects of great altitudes became so widely recognised that in one part of the line pilots were instructed not to fly above 16,000 ft. This order could not be enforced, and was, in fact, disobeyed, for the simple reason that they preferred the obvious tactical advantage to what seemed to many the purely hypothetical drawbacks, and the instinct of self-preservation guided their conduct. It has always been my opinion that the paralysing and insidious effects of oxygen-want had a far greater influence in determining the course of aerial operations than has yet been realised.

HIGH ALTITUDES BEFORE THE ADVENT OF THE AEROPLANE.

Our knowledge regarding the effects of high altitudes no doubt originated in the experiences of mountaineers; nevertheless, experimental balloon ascents[2] date back as far as 1800.

In 1800 Robertson and a companion ascended from Hamburg to 21,500 ft. and observed pain in the ears and difficulty in hearing one another speak. In the same year Gay-Lussac and Biot ascended from Paris to 23,000 ft. and noticed in addition to the great cold laboured breathing, quickened pulse, and headache. In Italy, also in 1800, Zambecani, Grassati, and Andreoli made a similar ascent; all were nearly frozen to death, and the two former became unconscious. In 1831 Glaisher and Coxwell made their historic ascent. At 19,000 ft. cyanosis, rapid pulse, and difficulty in breathing were recorded, together with difficulty in reading instruments, although they could be seen perfectly well; at greater altitudes great muscular weakness supervened, and at 29,000 ft. Glaisher fell down unconscious; Coxwell, however, although paralysed in his limbs, was able to open the valve by pulling on the valve cord with his teeth. The lives of both men were saved, and it certainly appears a little remarkable that shortly after landing they were able to walk home, a distance of some seven miles. In 1875

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Tissandier, Sivel, and Croce-Spinelli, under the direction of Paul Bert, made their famous but fatal ascent to 27,500 ft., to which further reference will be made.

Just previous to the war the Pike's Peak expedition[3] had published its report on the physiological effects observed during the first few days after reaching the summit (14,100 ft.) and during the subsequent processes of acclimatisation and deacclimatisation, while in 1912 there appeared an account of the Duke of the Abruzzi's remarkable expedition to the Himalayas made three years previously.[4] The main conclusions of these two expeditions were in direct opposition to each other. Whereas "mountain sickness" was experienced by all four members on arrival (by *train*) at the summit of Pike's Peak, and shortness of breath and undue fatigue on exertion were experienced even when "acclimatised" by a stay of five weeks on the mountain, four members of the Abruzzi expedition made an ascent from 22,842 to 24,600 ft. through deep soft snow "without exhaustion, without lowering of morale, without exaggerated difficulty of breathing, without palpitation or irregularity of pulse, and with no symptoms of headache, nausea, or the like." And the report goes on to add, "the fact of the immunity admits of but one interpretation—namely, that rarefaction of the air under ordinary conditions of the high mountains, to the limits reached by man at the present day, does not produce mountain sickness."

The experiences of the Abruzzi expedition were at variance with early experiences in the air in France, and it was obvious that whereas in the former a high degree of acclimatisation had had time to develop, a similar compensation was denied to the aviator. In other words, an individual sitting quietly in his machine might fly without discomfort to 16,000 ft., but if he had landed on a mountain aerodrome at this height he would almost certainly have been incapable of walking 100 yards.

The experiments made several years ago by Haldane and his collaborators, both in steel chambers and by breathing air deficient in oxygen, were chiefly of theoretical interest. The majority of them, moreover, were of short duration, and the subjects were few in number. They had nevertheless demonstrated a fact of the greatest practical importance and interest—viz., the existence of wide individual variations in response to oxygen-want.

MEDICAL ASPECTS OF HIGH FLYING AS OBSERVED DURING THE WAR.

A. *Effects while in the Air.*

Up to about 15,000 ft. a great many individuals noticed nothing unusual provided the flight was a short one, while a smaller number were similarly unaffected in short flights at considerably greater altitudes. The speed of ascent was an influence difficult to estimate; much more important was the duration of exposure to great altitudes. Remaining at anything over 15,000 ft. for over an hour was nearly always productive of some noticeable alteration, which was aggravated by increase of altitude and length of exposure.

1. *Mental effects.*—These corresponded in every way with what has been observed in other conditions when the organism is suffering from want of oxygen, accidental (carbon monoxide poisoning) and experimental, and consisted of a dulling of perception rather than of sensation.[5] Memory was similarly affected and the registration of events incomplete. Many an officer has been taken to task for lack of observance on high reconnaissance owing to his inability on landing to report what he had observed, and squadron commanders were eventually in the habit of drawing up a pro forma report with a questionnaire necessitating nothing more than a filling in of yes or no. One squadron commander informed me that not only did this help him to get accurate information, but that if his officers were left to write out their reports in full "they would be muddling about at them for hours," and make so many mistakes in writing and spelling as to render them barely decipherable.

Officers doing long reconnaissance, although able to see the ground perfectly, often failed to recognise the country they were flying over, while some amusing incidents were provided by observers making mistakes with their cameras; they were usually aware that something was wrong, but indignantly attributed the mischief to some fault of the camera rather than to their own mental incapacity. One observer returned from a high photographic reconnaissance well pleased with his effort until it was discovered that he had taken 18 photographs on the same plate; when tested in hospital by the nitrogen-diluting method to 18,000 ft. he fell fast asleep, and could only with difficulty be roused.

The onset of these mental effects was so insidious as frequently to pass unnoticed. In character they are not at all unlike those produced by alcohol. Pilots have attacked enemy formations without any plan of campaign but from sheer bravado, making tactical errors of which under ordinary circumstances they would never have been guilty; on the other hand, an officer has been known to wave his hand in friendly greeting to the enemy. Irritability and unreasonableness were other characteristic features; in a certain type of machine in which pilot and observer communicated with one another by means of hastily written notes one pilot threw all the notes overboard without reading them in sheer disgust.

Diminution of auditory sensations was generally recognised, but the fact that the engine became almost inaudible above 20,000 ft. never seemed to strike them as remarkable.

Another feature was the tendency to go to sleep. A pilot, for example, was returning from a long bomb raid at 17,000 ft. using oxygen; as he did not begin to descend after crossing the lines, but appeared intent on gaining the English coast rather than his own aerodrome, his observer reluctantly took action and roused him from his sleep, which was due to his oxygen-supply having run out.

The mental effects of oxygen-want have never been more vividly described than by Tissandier, the sole survivor of the balloon ascent in 1875, in which all three individuals were provided with oxygen but were paralysed before realising the necessity of using it. "The condition of torpor which overcomes one is extraordinary. Body and mind become feeble little by little, gradually and insensibly. There is no suffering; on the contrary, one feels an inward joy. There is no thought of the dangerous position; one rises and is glad to be rising. The giddiness of high altitude is not an empty word; but so far as I can judge from my own impressions it appears at the last moment and immediately precedes extinction, sudden, unexpected, and irresistible."[1]

Although the mental effects at altitudes commonly reached during the war (15,000 to 23,000 ft.) so often passed unnoticed, many experienced officers fully realised the characteristic impairment of judgment, the delay in making up one's mind, or even a complete inability to do so. From the military standpoint two effects are of particular importance. The first is what may be described as a loss of morale, which was recognised by many officers; the offensive spirit dwindles to nothing and there is a general disinclination to do anything more than wait about until it is time to fly home. The second is the inaccuracy and lethargy of the mental faculties, rendering rapid action impossible; this is reflected in the statement of many that they shot badly at great altitudes. A great deal remains to be done in the investigation of the alteration in psychometric reactions in anoxæmia before we can elucidate the problems of aerial warfare. Nevertheless, these considerations would seem to go far to explain the comparative rarity of aerial combats above 16,000 ft.

2. *Alterations in breathing.*—Nose-breathing ceases at about 12,000 ft. in most people, while at higher altitudes deeper breathing becomes noticeable. To remain at, say, 17,000 ft. or more for any length of time causes definite hyperpnœa, usually described as "difficulty in getting one's breath." The periodic type of breathing was apparently less common, but nevertheless occurred. One pilot, for example, during a test flight, in which he attained 18,500 ft. in about 20 minutes, was so overcome and periodic breathing became so severe that he lost control of his machine; he managed to get down and land safely, but had to be helped out in a dazed condition and was unable to walk without support. When tested in hospital up to 18,000 ft. periodic respiration began early and persisted for 20 minutes after the termination of the experiment.

The power of holding the breath, although, of course, not noticed by the flying officer, is greatly diminished at increasing altitudes; in fact, I was in the habit of using this test as a rough indication of the efficacy of oxygen apparatus.[6] This is shown in Tables I. and II.:—

EXPERIMENT I.—*Without Oxygen.*

Time from start in minutes.	Height in feet.	Time breath held in seconds.
0	Ground	82
14	10,000	71
29	15,000	53
46	18,000	32
68	20,000	24
87	20,850	13
121	8,000	57

EXPERIMENT II.—*With Oxygen.*

Time from start in minutes.	Height in feet.	Time breath held in seconds.
0	Ground	78
9	3,000	78
18	8,000	81
35	12,000	75
48	14,500	79
56	16,000	74
67	16,500	75

Respiratory symptoms were naturally aggravated by exertion—e.g., fighting, using a pressure pump, taking photographs, talking, &c.—and under these circumstances were observed at comparatively low altitudes—e.g., 14,000 ft.

3. *Muscular weakness.*—This affected observers rather than pilots. The slightest exertion, such as bending down and drawing the shutter of the camera, or even talking, was "hard work." An observer's activities when fighting, standing up, operating a machine gun, and swinging a

heavy mounting were very considerable, involving an amount of work which doubled or trebled the respiratory per minute volume. Under these conditions they rapidly became breathless and exhausted, and engagements had to be broken off.

Nearly all pilots agreed that machines were difficult to fly at great altitudes, owing, as they supposed, to "the thinness of the air." That this was to some extent due to muscular weakness seems proved by the fact that when supplied with oxygen the difficulty largely disappeared.

4. *Fainting.*—The only certain instances of this occurred amongst observers after exertion.

5. *Vomiting and hæmorrhage.*—The former was very rare, and only one case of the latter (epistaxis) was reported.

6. *Frequency of micturition.*—This phenomenon was very common, and is probably explained by the combination of cold and vibration.

B. *Immediate After-effects.*

About the fatiguing effects of high-altitude flying there was complete unanimity. The scout pilot, it is true, was relatively little affected, but for those who were employed on long and high reconnaissance and patrols the after-effects were actually distressing. To realise this one only had to watch a flight landing from high patrol. The gait is unsteady and laboured, reports are laboriously made out (there being a general disagreement as to what was seen and done), tempers are short, everybody looks and feels tired, and the idea uppermost in the mind is to lie down and go to sleep. Severe frontal headache is common; it may persist until the following day and at times prove incapacitating. Appetites are poor and spirits depressed. It is easy to understand that a repetition of this kind of work over any length of time was rapidly productive of deterioration of mental and physical well-being.

The chief characteristics of flying at high altitudes were, therefore, an impairment of efficiency in the air and, as a result of its exhausting effects, a shortening of the active service period.

This summary, however, requires qualification, for there was always a small but important minority of officers who were remarkably resistant to anoxæmia. Scout pilots who were never subjected to long exposures especially denied any ill-effects, either immediate or cumulative, and even officers employed on long reconnaissance occasionally showed unexpected powers of resistance. An example of this may be mentioned:—

Captain X., D.S.O., M.C., age 21. Long-distance runner since early boyhood. 550 hours flying as instructor, 150 hours' active service, 1916; now completed another 300 hours' active service fighting-reconnaissance at 18,000 to 21,000 ft. Weight (estimated), 150 lb.; height, 5 ft. 9 in.; breath holding, 110 seconds; expiratory force, 180 mm. Hg; vital capacity, 4250 c.cm.; B.P., 120/85; pulse sitting 80, standing 78, exercise 85. As a flight commander he has "set the pace" in his squadron, and has been entirely immune to the ill-effects which were being experienced, largely as a result of his leadership, by his own observers and the rest of his companions. Judging by results, he was clearly efficient under conditions in which the rest could barely manage to follow. He saw at least two relays of officers go home exhausted after three or four months before he at last began to suffer from severe headache after landing, and a little later from symptoms in the air.

THE USE OF OXYGEN IN AERIAL WARFARE.

From experience which was accumulating in the field and from the results obtained by previous experimenters the necessity of equipping machines with oxygen apparatus was self-evident. At what altitudes oxygen would be necessary was less clear, although its use at comparatively low altitudes appeared desirable from the purely physiological standpoint.

At this time (end of 1916) it seemed likely that oxygen would be more particularly required by the fighting scout owing to its great and increasing climbing powers. Remembering that in the modern military machine a pilot frequently had as many as 20 instruments to watch, it seemed essential to provide him with an apparatus which would require no attention. It accordingly had to deliver the requisite amount of gas automatically, and, in addition, had to be provided with a simple indicator so that a pilot could see at a glance whether his instrument was working satisfactorily. That the amount of oxygen delivered should be regulated by the instrument and not by the pilot was further indicated by the consideration that the latter is no judge of when or in what quantities he requires oxygen, while his attention was likely to be diverted by the necessities of the moment from symptoms the significance of which he could not be expected to gauge. Further, as every ounce of weight was supposed to make a difference to the performance of the scout machine, and as space was at a premium, the apparatus had to be light and compact.

These desiderata were satisfied by the apparatus designed by my recent colleague, Professor Dreyer, on whose advice in these and many other matters I so largely and gladly relied. The essential feature of this apparatus was the regulation of oxygen delivery by an aneroid-controlled valve, so that the amount delivered varied in inverse proportion to the barometric pressure surrounding the instrument, and, consequently, in direct proportion to the height.

The reasons for the unsuitability of any high-pressure oxygen apparatus as opposed to liquid oxygen for use in aeroplanes in war-time are of no physiological importance, except that the weight and bulk of the cylinders limit the amount of oxygen which can be carried. The military drawbacks cannot, however, be disregarded, but it is only fair to remember that the industrial position of this country differed fundamentally from that of Germany. The latter, cut off from the nitrate supplies of South America, was forced to develop on a large scale the manufacture of liquid air in order to secure the supplies of nitrogen necessary for making explosives. They therefore had no difficulty in equipping their aeroplanes with liquid air or oxygen.

It is evident that the constant delivery of oxygen in suitable quantities, automatically controlled by changes in altitude, will keep the pilot under physiological conditions throughout his flight; and that accordingly continuous delivery is greatly preferable to an intermittent one, in which the quantities delivered would be largely controlled by the pilot. Unfortunately, however, continuous delivery entails the constant wearing of a face-mask, or at least (though far less satisfactory) of a pipe held between the teeth, and it was on this seemingly trivial point that the use of oxygen by the fighting scout pilot, for whose particular benefit all our plans had been laid, broke down.

There is an old saying, I believe, that "no man ever commits suicide with his hat on." Certainly it proved to be the case that practically no pilot, whose prime duty it was to seek out the enemy and destroy him or be destroyed, relished the prospect of undertaking the task with a mask over his mouth and nose. For much the same reason several of the most famous fighting pilots dispensed with their goggles and even their flying helmets. Whether this natural dislike, one can hardly call it prejudice, can be overcome by education remains for the future. That it nevertheless is possible to fight, and fight successfully, with a mask was demonstrated by not a few officers who were attacked when engaged on long and high reconnaissance, a type of work for which oxygen was absolutely essential. We had, unfortunately, a practical demonstration that long reconnaissance (three hours or more) at 20,000 ft. was impossible without oxygen. Not only were officers unable to give an account of their observations on landing, but the numbers available for duty rapidly dwindled. To these individuals oxygen in spite of the mask came as an unmitigated blessing. Ability to make full use of an aeroplane's climbing powers and performance at altitudes ranging up to 22,000 ft. with conservation of the individual's well-being enabled single machines without escort to make the most valuable and comprehensive reconnaissances far over the enemy's territory. Two squadrons, which were confined to this kind of work, in a few months took an enormous number of photographs over a large range of enemy country with comparatively light casualties, while the length of the active service period among their officers was at least as high as any other squadrons in the field.

The Quantity of Oxygen Required.

The amount of oxygen required to maintain physiological conditions naturally depends on (*a*) the altitude, and (*b*) the volume of air breathed per minute, which in turn depends on (*c*) the amount of work done. The relation of barometric pressure to altitude is seen in Table III.,[7] to which is added for convenience the percentage of oxygen in the inspired air, which measured at sea-level would give the same values of

TABLE III.

Barometric pressure in Hg.	Altitude in feet.	Corresponding O2 percentage at 760 mm.	Barometric pressure in Hg.	Altitude in feet.	Corresponding O2 percentage at 760 mm.
760	0	20·96	412	16,000	11·39
704	2,000	19·38	382	18,000	10·56
651	4,000	17·93	354	20,000	9·78
602	6,000	16·60	328	22,000	9·05
557	8,000	15·37	303	24,000	8·35
516	10,000	14·25	278	26,000	7·68
478	12,000	13·24	254	28,000	7·03
444	14,000	12·28	230	30,000	6·40

partial pressure of oxygen as exist in ordinary air at the corresponding altitudes.

A pilot being more or less immobilised in his machine is debarred from taking exercise, while his somewhat cramped position probably handicaps deep breathing. His observer, on the other hand, has considerable latitude of movement and at occasional intervals is called upon to perform hard muscular work. The following table of respiratory volumes and rates per minute (Table IV.) corresponding to different work-equivalents is quoted from Haldane.[8]

TABLE IV.

—	Air breathed in litres per min.	Average volume of each breath in litres.	Number of breaths per min.
Rest in bed	7·7	0·457	16·8
Rest standing ...	10·4	0·612	17·1
Walking 2 m.p.h....	18·6	1·27	14·7
Walking 3 m.p.h....	24·8	1·53	16·2
Walking 5 m.p.h....	60·9	3·14	19·5

The average respiratory volume per minute of 17 subjects in the sitting posture examined by Ellis[9] was 7·37 litres. The work done by an observer fighting his gun approximates to the work-equivalent of a man walking between two and three miles an hour.[10] Owing to the limited amount of compressed oxygen which can be carried in an aeroplane it was necessary to regulate the automatic delivery of oxygen so that it would last for the whole period of the flight, and a certain amount of economy was therefore imperative. It was eventually decided to supply sufficient for a man doing a work-equivalent of walking just over two miles an hour—i.e., breathing 20 litres per minute;† in other words, more than twice the amount actually required by the pilot or observer, provided they were sitting still. Against this it must be mentioned that no attempt was made to obviate loss of oxygen during expiration; this would have involved an expiratory valve and collecting bag, which would have added to the complexity and vulnerability of the apparatus, and also taken up valuable space. Judged subjectively in the air, and by the freedom from headache and fatigue after landing, the amounts supplied were ample, and officers thus supplied were known to carry out on the same day two reconnaissances of three hours each or more at 20,000 ft. without ill-effects.

THE REACTION OF THE HUMAN ORGANISM TO LOWERED PARTIAL PRESSURE OF OXYGEN.

All recent investigations have confirmed the views enunciated in 1876 by Paul Bert as a result of his experimental researches that the symptoms experienced under lowered barometric pressures are due not to the mechanical effects of the lowered pressure but to the fall of the partial pressure of oxygen. In other words, they are due to want of oxygen.

There are three experimental methods available for the study of oxygen-want in man. In the first the percentage amount of oxygen in the air breathed can be reduced, the atmospheric pressure being unaltered; secondly, the oxygen can be displaced from the hæmoglobin by adding to the air breathed a gas such as carbon monoxide with an affinity for hæmoglobin 300 times greater than that of oxygen; while thirdly, a steel chamber may be used in which the air pressure can be reduced at will by means of a pump. This last procedure was not practicable in France, although for long experiments it presents perhaps advantages over the other two; its disadvantage lies in the fact that the observer, like the observed, is the victim of oxygen-want, and his powers of making accurate observations are correspondingly impaired. The first method is capable of wide variations; here I will only mention two: (*a*) the re-breathing and (*b*) the nitrogen-diluting methods. In the former the subject breathes in and out of an enclosed space, his expired CO_2 being absorbed by caustic soda; in this way he gradually uses up the available oxygen and suffers from a progressive degree of oxygen-want, to which he would succumb were the experiment not terminated and the subject rapidly returned to ordinary air. The "altitude" attained by the subject is then calculated from the percentage of oxygen found by analysis of the air in the chamber at the end of the experiment. Depending on the amount of air originally available, the experiment will be short or long. The short, or bag, method (5 litres of air) has been employed by Flack[11] in this country, while the longer method (60 litres of air) has been extensively used in America. The main drawback to these methods is that the experiment is a progressive one, comparatively short, and it is impossible to maintain the subject at any given oxygen pressure; in terms of flying it is as if the pilot were to continue to ascend until he lost consciousness. It also involves the wearing of a nose-clip and breathing through a mouth-piece.

The nitrogen-diluting method devised by Dreyer[12] is based on the principle that if nitrogen is added to the air breathed it is possible to change at will the relative proportions of atmospheric air and of nitrogen, and so to change the partial pressure of oxygen. By this method the subject can be examined for any length of time and at any "altitude" desired, while the examiner is free to make the necessary investigations unhampered himself by lack of oxygen. Except for wearing a light face-mask, the subject is free to move all his limbs.

A. *Earlier Experiments.*

It was shown by Haldane and Poulton[13] in 1908 that whereas a rapid fall of oxygen in the inspired air is accompanied by great hyperpnœa, a more gradual diminution was associated with no evident hyperpnœa owing to the preformed CO_2 having time to escape. A still more gradual fall in O_2 pressure, especially if it were maintained, as in the long steel-chamber experiments of Boycott and Haldane,[14] gives time for an accumulation of acid substances, the result of imperfect oxidation, which will serve to reinforce the action of CO_2 in exciting the respiratory centre,[15] and therefore serve to ward off the effects of want of oxygen. The view that the CO_2 tension of the arterial blood, the carbonic acid acting by virtue of its acid properties, is the *physiological* stimulus to the respiratory centre, whereby the pulmonary ventilation is regulated to suit the requirements of the organism, has become an accepted faith in physiology and medicine as a result of the experimental investigations first of Haldane and secondly of Hasselbalch.[16] A rise of CO_2 tension such as results from exercise will stimulate the centre, and the corresponding increase in ventilation will tend to keep the CO_2 at a convenient level, at the same time, by raising the alveolar O_2 tension, providing oxygen for the increased needs of the body.

When the organism is subjected to lowered barometric pressures for a matter of days or more various adaptive processes come into play; of these we need here mention only one—viz., an increased percentage of hæmoglobin in the blood. This increase was ascribed in the Pike's Peak report[8] during the first few days partly to concentration of the blood and afterwards entirely to an increase in the total amount of hæmoglobin. Dreyer and Walker,[17] however, in an analysis of these results, but more particularly of data obtained by Abderhalden[18] on rabbits kept at St. Moritz (6000 ft.) concluded that the increase in the hæmoglobin percentage was attributable during the first day or two wholly to a diminution of blood volume effected by concentration of the blood at the expense of the plasma, and during the remaining period half to new formation of hæmoglobin and red corpuscles and half to blood concentration. When the animals were brought down to sea-level the blood volume was restored in two or three days, whereas the disappearance of the newly formed hæmoglobin and red cells occupied two or three weeks.

B. *Investigations During or Since the War.*

As a result of numerous examinations on flying officers by the nitrogen-diluting method, Corbett and Bazett[19] concluded that the normal reaction to a degree of oxygen-want corresponding to altitudes of from 15,000 to 19,000 ft. consists in an increase of pulse-rate of about 30 per cent., of pulse pressure of about 35 per cent., of pulmonary ventilation of about 50 per cent., and after about half an hour in some degree of blood concentration, as evidenced by a rise in the hæmoglobin percentage. The rise in pulse pressure is brought about by a gradual fall in the diastolic pressure until a new low level is reached, which is maintained, the systolic pressure remaining unaffected, or rising slightly. The increased ventilation is effected by a marked deepening of the breathing, the rate being little affected or even slowed. They further found that whereas in those who responded well there was a general correspondence in the intensity and time relations of the circulatory and respiratory reactions, this was often not so in those susceptible to reduced O_2 pressures. Their paper also shows that these responses occur early and gradually reach a maximum.

These findings have been confirmed and amplified by Schneider and his co-workers in America. Taking the initial reaction first, Ellis,[9] using the long rebreathing method, found in 23 out of 29 subjects an increase of respiratory volume at the end of the fifth minute, corresponding to an oxygen percentage of 18·1 (4000 ft.), and on restoring the subjects to ordinary air from very low O_2 percentages, a prompt return to the normal volume. Lutz and Schneider,[20] using the low pressure chamber and nitrogen-diluting methods, found in both a fall of alveolar CO_2 tension and increase of respiratory volume beginning at an "altitude" of 4000 to 5000 ft.; in each case the

† Amount required can be calculated as follows: Of 20 litres of air 1/5th is O_2 = 4 litres. At 380 mm. Hg (18,000 feet) the partial pressure of O_2 is halved—i.e., half the required O_2 will be obtained from the air breathed, and half must be added artificially—that is to say, at 18,000 feet apparatus must deliver 2 litres O_2 per minute *measured at 760 mm. Hg.*

pressure was reduced or the proportion of nitrogen increased so as to correspond to an increase in altitude of 1000 ft. per minute, which is approximately the rate of climb of the modern military aeroplane. Similarly[21] acceleration of the pulse usually began between 6000 and 8000 ft. and in every case before 9000 ft. (i.e., within nine minutes). By giving the subject pure nitrogen to breathe, a procedure which necessarily reduces the alveolar O_2 pressure very rapidly, since under these conditions the venous blood will give up its O_2 to the alveolar air by diffusion, the quickening effect on the heart occurred within 15 seconds or less in 66 per cent. of cases, and the respiratory volume increased within a similar period in 61 per cent. On restoring the subject to normal air the pulse-rate slowed within 15 seconds or less in 86 per cent. of cases, and the respiratory volume decreased within 10 seconds or less in 89·3 per cent.[22] In all cases the respiratory and circulatory responses developed before the subject appeared to come under any stress from lack of oxygen. Mathison[23] had previously found that the systolic output of the heart in animals subjected to pure nitrogen rapidly increased to reach its maximum in 30 seconds.

If now an individual be "held" at an "altitude" for 60 to 120 minutes (as in flying) the reactions can be further studied. Lutz and Schneider find that the pulse-rate reaches a maximum about six minutes after 18,000 ft. (382 mm. Hg in steel chamber) has been attained, and 14 minutes after 19,500 ft. (nitrogen method). The cyanosis also take a little time to reach its maximum. After this latent period of a few minutes the pulse-rate decreases in 72·5 per cent. of cases, or remains unaltered in 22·5 per cent., and with this diminution in pulse the cyanosis gets less and the general condition improves. Similarly the systolic arterial pressure remains unaltered, or rises slightly to fall again to its previous level; only in individuals who stand O_2-want badly is there a progressive fall. In 70 per cent. of cases the diastolic pressure gradually falls to a lower level which it maintains, sometimes to rise again at a later period. The pulse pressure follows the diastolic in inverse ratio.[24] As regards the breathing, the alveolar CO_2 tension and respiratory per minute volume reach the former its minimum and the latter its maximum 5 to 10 minutes after 18,000 ft. has been attained, after which the former tends to rise and the latter to fall to new levels, which are sustained. The character of the breathing is deep and slow, with a tendency towards periodicity, while in no case was shallow breathing observed, and in only 2 out of 24 was the rate increased.

The Changes Summarised.

We may summarise these changes as follows. In a large majority of healthy young men, during an ascent to 18,000 ft. at the rate of 1000 ft. per minute, the respiratory volume early begins to show a progressive rise, and the systolic output of the heart early and progressively increases until the maximum altitude has been maintained for some 5 to 10 minutes—i.e., 20 to 30 minutes from the start of the experiment. At this point the breathing and cardiac action tend to quiet down and the general condition improves.

This improvement in a majority of cases synchronises with an increase of the hæmoglobin percentage in the blood, whether taken from the veins or capillaries. This increase cannot be due to new formation of hæmoglobin and red cells, since it appears within 20 to 30 minutes; it must, therefore, be the result of withdrawal of fluid from the blood or of the throwing into the circulation of corpuscles which were previously side-tracked. For the latter hypothesis there is no experimental evidence, and it is difficult to conceive how or why such a thing could occur. We must, therefore, assume that a concentration of the blood occurs which in some way relieves the circulation and (probably indirectly) the respiration.[24] In 26 out of 47 experiments retardation of the pulse was associated with an increase in the hæmoglobin percentage up to 10 per cent.; in all these compensation to oxygen-want was good. In 9 out of 47 a rise in hæmoglobin took place but was delayed, and the pulse did not slow; in these the compensation was inadequate.[25]

Lutz and Schneider further point out that the respiratory and circulatory responses frequently show no correspondence either in their time relations or degree of intensity, that there are wide individual variations, and that the type of reaction may not always be the same in the same individual when tested on different occasions. Moreover, in no case, as Corbett and Bazett also found, was complete compensation for altitudes of 18,000 to 19,500 ft. ever observed; some degree of cyanosis was always present, and the mental condition gradually failed with a tendency to go to sleep. Further, headache and general fatigue were common after-effects in the longer experiments and the alveolar CO_2 tension took some time to return to its normal figure.

In what way blood concentration spares the heart is not clear. The experimental records certainly seem to show a tendency for the diastolic pressure to cease falling or even to rise as the concentration becomes effective. The primary fall of diastolic pressure is probably due to arteriole relaxation, and it is possible that the blood concentration increases the viscosity of the capillary blood to a degree sufficient to raise the diastolic pressure, but insufficient to produce capillary stagnation. A high hæmoglobin concentration would certainly appear to facilitate the respiratory function of the blood as opposed to a low one, but the fact that, when sojourn at high altitudes is *prolonged*, the blood volume tends to increase pari passu with the formation of new hæmoglobin and red cells rather suggests that the reduction of blood volume is not altogether a convenient process.

It has recently been shown by Kellaway[26] that in animals anoxæmia is readily productive of an increase of the blood sugar. This increase is due to a direct stimulation of the central nervous system, which by splanchnic innervation causes a mobilisation of sugar directly by action on the liver cells, and indirectly by accelerating the output of adrenalin, which in turn acts on the liver. In severer degrees of anoxæmia the want of O_2, apart from any stimulation of the nervous system, by its direct action on the suprarenals and possibly also on the liver, leads to hyperglycæmia. How far this over-production of adrenalin is responsible for the circulatory, respiratory, or blood phenomena which we have just discussed, it is impossible to say.

COMPARISON BETWEEN ANOXÆMIA AND "SHOCK."

When an individual is exposed to still lower pressures of O_2 than those which we have studied the respiratory centre fails from fatigue, the blood pressure falls, and consciousness is lost.

The failure of the heart is probably to some extent due to inadequate venous inflow, occasioned possibly by a rise of blood viscosity, and also, when the breathing fails, to a loss of the favourable influences exerted by respiration on the venous return by the aspiration of the thorax. Defective venous inflow must necessarily be followed by defective systolic output, the blood pressure will fall, and the circulation come to an end. A fall of venous pressure has, in fact, been recorded at high altitudes by several observers.[27] More important, however, is the likelihood of the cardiac muscle itself becoming exhausted from want of oxygen. It has been shown[28] that the heart may fail not only from being confronted with more work than it can do, but also by a primary failure of its own metabolism. In the second type of failure the rate of beat may be slowed, and a falling pulse-rate in fatigued flying officers, tested close to their breaking-point of oxygen-want, has been observed by Corbett.

Surgical shock and altitude sickness are both concerned with want of oxygen; in the latter the supplies are inadequate, while in the former it is the transport of O_2 which is at fault. The similarity of the bodily changes in shock and anoxæmia is, however, more apparent than real. In both there is an increased rate of heart-beat, but whereas the fall in systolic pressure occurs early in shock it is a terminal event in anoxæmia, while the converse is true for the increased ventilation. In both conditions it has been taught that there is an "acidosis." Concerning "acidosis" and the confusion which has resulted from the use of this polyvalent word further reference will be made. Here it is only necessary to point out that the injection of a non-volatile acid into the circulation does not produce "shock," while the view that "acidosis" is the cause of "shock" has been replaced by the view that an increase of acid substances occurs in "shock" owing to the defective tissue oxidation which results from the shock-like condition.[29] The final point of resemblance between shock and anoxæmia lies in the concentration of the blood which occurs in both. The conditions under which shock occurred in the field especially favoured capillary stagnation and concentration of capillary blood; this must diminish the venous return to the heart and the arterial pressure therefore falls.[30] The loss of water from the blood may in shock rapidly become extreme; in animals, for example, after an injection of histamine a rise in the hæmoglobin percentage from 72 to 120 may occur within six minutes.[31] In the experiments with low O_2 pressures, however, the rise is more gradual and rarely exceeds 10 per cent., and it appears, moreover, to be a favourable rather than an adverse factor. Shock, in brief, is primarily a condition of circulatory depression or failure, while anoxæmia is essentially one of disturbed metabolism.

ACCLIMATISATION.

An improvement in the condition of mountain-climbers during their stay at high altitudes was recognised long ago. The improvement observed on Pike's Peak was attributed to three factors, which can be separately considered.[3]

1. *Increased secretory activity of the lining cells of the lung alveoli.*—It is common knowledge that the physiological world has for many years been divided into two schools of thought concerning the processes by which O_2 is transferred

from the alveolar air to the blood in the lung capillaries. On the one hand, it is affirmed, especially by Krogh[32] and his collaborators, that the physical processes of diffusion, involving a head of O_2 pressure greater in the alveolar air than in the blood of the pulmonary veins, is sufficient to explain the transfer at rest, during exercise, and during exposures to lowered O_2 pressures. Bohr, Haldane, and Barcroft[33] hold, on the other hand, that whereas diffusion will explain the conditions at rest, it will barely do so during exercise,[34] and certainly will not do so at high altitudes. Using the CO method for determining the tension of O_2 in arterial blood, it was found that on Pike's Peak this tension was greater than the alveolar O_2 tension, a result which can only be explained by secretion; whereas Krogh,[35] using the bubble aerotonometer finds that the arterial O_2 tension is always less than the alveolar, and the difference in tension, taken in conjunction with the amount of blood passing through the lungs per minute,[35] satisfies the diffusion theory under all conditions.

Unless secretion of O_2 by the lungs can be definitely shown to exist under physiological conditions such as exercise, the improbability of such a mechanism having been developed solely for the convenience of mountaineers or aviators becomes very great. There are, it is true, many a priori objections which can be adduced against the secretion hypothesis, and, as Bayliss[37] points out, it seems odd that although on Pike's Peak the arterial O_2 tension was always greater than the alveolar, it was nevertheless always less than the atmospheric O_2 tension; if secretion occurs, why should the secretory power always fail at this point? But a priori objections must give way to experimental facts, and it is better here to regard the question as being a divergence of opinion founded on a divergence of methods.‡

The important point to realise for our purposes is the fact, admitted by the supporters of the secretion theory, that the secretory powers, supposing that they exist, are inadequate, and the pulmonary epithelium fails to carry out satisfactorily the very small[39] amount of work it is called upon to do. Moreover, we know of no clinical methods by which these powers can be stimulated to increased activity.

2. *Lowering of the exciting threshold of the alveolar CO_2 tension.*—For an equal production of CO_2 the alveolar ventilation is greatly increased at high altitudes as compared with sea-level. This has been ascribed to the stimulating effect on the respiratory centre of the "lowered alkalinity" of the blood, so that the CO_2, being no longer the sole stimulus, its tension can be diminished without ill-effects. "Lowered alkalinity" of the blood has been recorded by numerous observers[40] at various altitudes, while a fall in CO_2 alveolar tension occurs early during an ascent, and is found in individuals living at such moderate elevations as 2200 ft.[41] (It does not, however, follow that because ventilation is increased that the blood is less alkaline (vide infra).) The increase in ventilation raises the alveolar O_2 pressure to a higher level than would otherwise be the case, and in this way constitutes an important factor in the compensatory process. That this occurs under flying conditions we have already seen.

3. *Increased percentage of hæmoglobin.*—The mode of production of this has already been discussed. The highest hæmoglobin percentage found among the Pike's Peak observers[3] was 134, with a red cell count of 7,800,000. In individuals who lived on the summit even higher figures were recorded—e.g., hæmoglobin 153 per cent., red cells 8,200,000. These changes imply a considerable increase in the oxygen capacity of the blood.

The stimulating effect of high altitudes on the blood-forming tissues had been previously recorded by many investigators,[42] and is evidently an adaptation evolved by the organism as a means of counteracting the effects of hæmorrhage. This valuable compensatory mechanism, as we should expect, however, is denied to the aviator, for of numerous flying officers examined under physiological conditions none was found to have an increase of hæmoglobin or of red cells.

4. *Circulatory changes.*—Except for a slight increase of pulse-rate no definite changes were observed on Pike's Peak after acclimatisation. For the flying man the matter is very different, and he responds vigorously to altitude by increasing the per minute output of his heart.

Evidence of Acclimatisation Among Aviators.

Many pilots state that they get accustomed to high altitudes when they first experience them. I was formerly of the opinion[43] that this merely meant that they get accustomed to the symptoms induced. There is, however, no question that the ability to withstand the effects, at least of short exposures, does increase in most individuals after the first few flights. Similar results have recently been obtained in low-pressure chamber experiments. In view of the rapid respiratory, circulatory, and blood reactions which constitute the normal reaction to high altitudes, this improvement would appear to be due to practice, and be of the same order as the improvement experienced by the athlete after a few short runs. In other words, practice facilitates the liberation of these reactions. That complete compensation never occurs is practically certain, and the cumulative ill-effects of a period of high flying clearly demonstrate that acclimatisation in the true sense of the word is unknown in the pilot.

In this connexion it may be asked whether a protracted period of high flying is capable of producing changes in the organs which can be recognised clinically. In other words, Is there a flying disease? This question can be answered in the negative as far as the conditions existing during the war permit of a definite answer being made. No organic changes in heart, lungs, or kidneys have yet been found which can be attributed solely to flying. Whether, however, prolonged and severe exposures to high altitudes without an artificial supply of oxygen are not able to effect changes in the nerve centres of a permanent character is not so certain, and there is, in fact, a certain amount of evidence that in rare instances such may be the case.[44]

THE REACTION OF THE BLOOD.

Before we can review the subject of anoxæmia we have to consider that much discussed and perplexing question, the reaction of the blood. It has already been mentioned that acidosis has been described as occurring in both shock and anoxæmia. Unfortunately the term acidosis is used by different writers to describe different conditions, while it is misleading in so far as it applies acidity, but in reality has very little to do with acidity. In this brief discussion I shall avoid it as much as possible.

The Maintenance of the Acid-alkali Balance.

It has recently become increasingly obvious that one of the balances which the organism is always striving to maintain is that between the acids and alkalies in the blood and tissues. This is not surprising when we consider the origin of life and the conditions under which life first appeared. It is, I believe, a fact that the salts of the blood are in the same relative proportions to one another as they are in sea-water, though in very different concentrations. In the blood of mammals the acid-alkali balance is represented by the ratio $\frac{H_2CO_3}{NaHCO_3}$ and the hydrogen-ion concentration of the blood—i.e., its acidity—is directly proportional to this ratio. If either the numerator or denominator is altered the organism will attempt to effect the necessary change, so that the ratio, and hence the H-ion concentration, or C_H, will be restored. It may, it is true, be restored at a higher or a lower level than normal, but at all costs it must be restored. There are several mechanisms made use of by the organism for maintaining this equilibrium. When an acid stronger than carbonic acid passes into the blood it displaces the CO_2 from an equivalent of bicarbonate, forming in its place its own sodium salt, as in the equation $HCl + NaHCO_3 = NaCl + H_2CO_3$. In this way the acid is neutralised and carbonic acid liberated. It is easy to understand that the change in C_H when acid is added to blood will not be nearly as great as when the same amount is added to water, for in the former the bicarbonate present will neutralise the acid ("buffer action") with the liberation of carbonic acid, the acid properties of which are very weak.[29] Nevertheless, the equilibrium has been disturbed to some extent since bicarbonate has been used up (diminution of "alkaline reserve"),[45] and the CO_2 in the system has been increased; in other words, the value of $\frac{H_2CO_3}{NaHCO_3}$ and, therefore, of C_H has been raised. It is generally accepted that *under physiological conditions* the value of C_H determines the activity of the respiratory (and possibly also the cardio-motor) centre, an increase augmenting its activity and vice versa.[15] In the example under discussion, therefore, the ratio $\frac{H_2CO_3}{NaHCO_3}$ will be brought back to normal by an increased ventilation, and consequent blowing off of carbonic acid out of the system.[46] In addition to the mechanism provided by respiration for keeping the ratio constant, the liver is capable of varying the output of NH_3, the kidneys of secreting excess of acid or alkali, while a further regulation is provided by ionic interchange between plasma and corpuscles.[47]

Regarding the value C_H as the normal stimulus to the respiratory centre, and in view of the circumstance that the "alkalinity" of the blood had been found to be lowered in anoxæmia, the respiratory response to want of oxygen has been conceived to take place as follows. Owing to

‡ Hartridge,[38] by observing the change of position of the absorption bands in the direction of the violet end of the spectrum when CO is breathed, found no evidence of O_2 secretion by the lung during violent but brief exertions.

defective tissue oxidation acid substances appear in the blood which raise the $\frac{H_2CO_3}{NaHCO_3}$ ratio; to this rise the centre responds by increased activity, the ventilation is raised, the alveolar O_2 tension tends to rise and so improves the oxidative processes, while CO_2 is got rid of. These effects all tend to lower the ratio and restore it to normal.

In view, however, of the great rapidity with which the organism responds to lack of O_2, these explanations require reconsideration, for, although the respiratory centre is admittedly a far more sensitive indicator to changes in C_H than any which we can employ for measuring this value, it is a little difficult to believe that the effects of defective tissue oxidation with resulting rise of C_H can be transmitted to the centre within a few seconds of breathing pure nitrogen, or that they can be sufficiently great to excite the centre when the oxygen in the inspired air has only fallen to 18·1 per cent.[29] These considerations recall the two views which have been held regarding the stimulus to the centre; in one[6] it was maintained that the centre could be directly excited by lack of oxygen, while in the other[18] that lack of oxygen, until the alveolar O_2 tension had fallen to 8 per cent., could only excite the centre indirectly by reinforcing the action of CO_2 by increasing the acidity of the blood. This divergence of opinion would appear to be one of words rather than of principles, but it certainly appears reasonable to assume that the sensitiveness of the centre to H-ions is determined by the oxygen tension in the arterial blood or in the centre itself.[48] In this way we can account for the rapidity with which the centre responds to quite small diminutions of oxygen, while it leaves entirely undisturbed our conception of carbonic acid as the stimulus under physiological conditions. As Starling points out, "the reactions of the organism have not been evolved in order to adapt it to balloon ascents or experiments in steel chambers."[49]

The Need for a Revision of Views.

"Acidosis" not only *is* a bad name, it also *has* a bad name; a person with "acidosis" is a patient. "Acidosis," moreover, has been conceived as being part of the anoxæmic condition. Hasselbalch,[50] however, under conditions of O_2-want observed a diminution of NH_3 excretion and an unusually alkaline urine. Why, then, when the body is suffering from an excess of acid does the liver diminish the production, and the kidney increase the excretion, of alkali? The assumption was that these organs were striving to maintain the level of acid as high as possible; that the organism, in fact, was trying to increase its acidity. These urinary changes have more recently been confirmed by Haldane.[51]

It has long been contended by Yandell Henderson[52] that "shock" is a state closely allied to acapnia, a condition brought about by excessive ventilation and washing out of CO_2. More recently Henderson and Haggard[53] have shown that this over-ventilation, which if not antagonised would lower the $\frac{H_2CO_3}{NaHCO_3}$ ratio and so reduce C_H, leads, if not too violent, to a balance being struck at a lower level, in which, although the alkali in the blood is greatly reduced, the ratio is restored. In such a case the alkali is redistributed in the body, and probably, though it is not so stated, some is excreted in the urine. This being so, the inconvenience of defining "acidosis" as a reduction in the plasma bicarbonate or "alkaline reserve"[45] becomes evident; the alkali *must* be reduced under these conditions if equilibrium is to be restored to a level compatible with the survival of the organism.

These facts suggest that the views hitherto current regarding the reaction to lack of oxygen require revision. In the first place, there is the initial response of the organism to the *stimulus* of O_2-want, consisting in an effort to maintain its supplies and transport of oxygen at an adequate level, the CO_2 being left, so to speak, to look after itself. Secondly, the increased ventilation must have the effect of lowering the $\frac{H_2CO_3}{NaHCO_3}$ ratio and decreasing the acidity. This decrease shifts the curve of dissociation of oxyhæmoglobin in such a way that O_2 is less readily dissociated where the O_2 tension is low—i.e., in the tissues where it is most wanted.[54] Thirdly, it would appear that the fall in C_H is resented by the organism, which attempts to counteract it by increasing the excretion and diminishing the production of alkali. Fourthly, the decrease of ventilation which is associated with blood concentration will assist to raise the acid-alkali balance, and so to diminish the alkalinity.

INDIVIDUAL VARIATIONS TO WANT OF OXYGEN.

The remarkable variations in the capacity of individuals to react to low O_2 pressures has long been recognised, and the experiences of the war have only accentuated them.

In some individuals when tested experimentally the response is found to consist of an excessive cardio-vascular or excessive respiratory reaction; between the two there appears to be no correlation, and the unaided response tends rapidly to exhaust itself. If now the respiratory pump is working at a greater rate than the circulatory, if, that is to say, more CO_2 is being got rid of than is being formed, the ratio $\frac{H_2CO_3}{NaHCO_3}$ must fall and the blood become more alkaline.[54] It is suggested that this lack of coördination between the two reactions may explain some of the individual differences which are so often observed.

SUMMARY.

The flying officer reacts to altitude by an early increase of ventilation which tends to raise the alveolar oxygen tension, and by an early increase of the circulation-rate which tends to improve tissue oxidation. These reach a maximum, and then tend to diminish in intensity, the diminution, or "second wind," being synchronous with, and presumably the result of, the development of a moderate concentration of the blood, as evidenced by a rise in the hæmoglobin percentage. The ensuing fall in ventilation will give the organism a chance to adjust the chemical reaction of its blood and tissue fluids which have been greatly disturbed in the direction of alkalinity. The adaptive processes are, however, never completely adequate for the higher altitudes attained in war, and the individual is handicapped by an impairment of his mental activities, of which he is himself largely unaware, and is incapacitated physically when called upon for any extra exertion. Moreover, the strain and fatigue of war are exaggerated by these repeated exposures, which serve to accelerate the processes of nervous and physical exhaustion.

The conditions imposed by flying at high altitudes are wholly dependent on the fall in the partial pressure of oxygen, and the loss of efficiency thereby entailed can be avoided by the administration of oxygen and by nothing else.

In this digression into the realms of physiology, the attractiveness of which in no way lessens its difficulties, I have in places had to traverse the same ground as that covered by my predecessor[55] of two years ago. Although I have avoided the use of the word "acidosis," I have reached, nevertheless, the same conclusion as he—viz., that under certain abnormal conditions "acidosis" is of benefit to the organism, which has, therefore, developed mechanisms for decreasing its production and of raising its excretion of alkali. The acid-alkali balance of the body must be preserved, and once this equilibrium is upset the organism strives to restore it by every means at its disposal, or dies in the attempt.

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THE VITAL CAPACITY CONSTANTS

APPLIED TO THE STUDY OF PULMONARY TUBERCULOSIS.

THE IMPORTANCE OF THESE CONSTANTS AS A GUIDE TO CLASSIFICATION AND AS A MEANS OF ASCERTAINING THE RESULTS OF TREATMENT.*

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IN THE LANCET of August 9th, 1919, one of us (G. D.) published a paper dealing with the normal vital capacity in man. In this paper it was shown that definite relationships between vital capacity and body surface, body weight, trunk length, and the chest circumference exist, expressed by the following formulæ:—

(i.) $\frac{W^n}{V.C.} = K_1$—where the power n is approximately 2/3, though more accurately 0·72.

(ii.) $\frac{\lambda^n}{V.C.} = K_2$—where the power n is approximately 2, though more accurately: in males 2·26, in females 2·3.

(iii.) $\frac{Ch.^n}{V.C.} = K_3$—where the power n is approximately 2, though more accurately: in males 1·97, in females 2·54.

Formulæ were also given which expressed the relationship between body weight, trunk length, and chest circumference respectively, as follows:—

(i.) $\frac{W^n}{\lambda} = K_4$—where the power n is approximately 1/3, though more accurately: in males 0·319, in females 0·313.

(ii.) $\frac{W^n}{Ch.} = K_5$—where the power n is approximately 1/3, though more accurately: in males 0·365, in females 0·284.

In all of the above formulæ—W = net body weight in grammes, λ = trunk length in centimetres, Ch. = circumference of chest in centimetres, V.C. = vital capacity in cubic centimetres.

It was also stated that different persons exhibit great differences in vital capacity, depending upon their occupation and mode of life. Thus persons living an athletic, healthy, outdoor life exhibit a greater vital capacity than persons living a sedentary life; that this difference in vital capacity in normal persons has nothing to do with fundamental bodily deficiencies is proved by the fact that properly regulated training and outdoor life can remedy this deficiency in vital capacity, as, for instance, boy scouting, army training, &c. The two sexes also differ, in the manner that the male has a greater vital capacity than the female.

The study of vital capacity in connexion with pulmonary tuberculosis is not novel, as John Hutchinson already in 1846 made use of vital capacity measurements as a help in the diagnosis of disease of the lung, more particularly tuberculosis. He showed that cases of this disease exhibited a lower vital capacity than that which he considered normal judging by the standing height of the individual. Quite recently the same subject has been carefully studied in a relatively small number of cases of pulmonary tuberculosis by Garvin, Lundsgaard and van Slyke, who also found that these cases showed a diminished vital capacity.

As we thought it was important to gain accurate quantitative information regarding the vital capacity in cases of tuberculosis of the lung by means of the above-mentioned formulæ, we decided to work jointly on the following line. One of us (L. S. T. B.) was to examine and make clinical notes of the patients, and also to take the various measurements required for the above formulæ, at the Brompton Hospital. The other (G. D.) to have no knowledge of the patients, but to form an opinion as to (1) classification, (2) prognosis, (3) the result of treatment—whether the patient was improving, remaining stationary, or getting worse, solely from the measurements supplied to him at Oxford. The only information given was the identification number of the patient, sex, age, occupation, and the measurements of weight, trunk length, circumference of chest, and vital capacity, while no information as regards the subject's condition was given, whether normal or diseased.

The procedures described in THE LANCET article of August 9th, 1919, for taking these various measurements are briefly recapitulated.

(1) Body weight = net weight without clothes in grammes.

(2) Trunk length in centimetres was taken by making the subject sit on a level floor with the knees flexed, the os sacrum, spine, and occiput being in contact with an upright measuring standard.

(3) Circumference of the chest in centimetres was taken at the nipple level in males, and just under the breasts in females, the subject being encouraged to talk and breathe naturally while the measurement was being taken.

(4) The vital capacity in cubic centimetres was obtained by taking five consecutive readings with a suitable spirometer. The subject was instructed carefully and patiently how to proceed, and encouraged to make the maximum effort.

Procedure for Calculation.

Since the publication of the above-named paper, tables have been prepared which are shortly to be published by Cassell and Co., where the vital capacity, corresponding to different weights, trunk lengths, and chest circumferences are given, as well as the normal weight corresponding to these measurements, for males and females. It has been found that for all practical purposes people may be grouped into three classes of different vital capacity—namely, A, B, and C—representing conditions of perfect, medium, and poor physical fitness. These tables have been used for the calculation of what the normal vital capacity should be in each case, paying due attention to the class the subject was likely to belong to according to his mode of life. The figure for vital capacity derived from the tables is always taken as equal to 100 per cent., and the individual is said to be normal, or minus, or plus so many per cent.

The reason for only making use of the vital capacity corresponding to trunk length and circumference of chest, and not of the vital capacity corresponding to the given weight in cases of pulmonary tuberculosis, often resulting in emaciation, is, that with loss of weight a vital capacity definitely abnormal when calculated in relation to the normal weight of the person might appear normal if calculated in relation to the reduced weight during disease. Whereas no such interference will be brought about when the vital capacity is calculated from trunk length, and only to a slight extent when calculated from the circumference of the chest.

Example:—Case No. 237.

Observation.

Male. Class A (ex-army). Age 20.	Chest circumference (Ch.) = 84·5 cm.
Trunk length (λ) = 88·0 cm.	Vital capacity (V.C.) = 2650 c.cm.

Calculation from Tables.

λ = 88·0 cm., gives vital capacity 4001 c.cm.
Ch. = 84·5 cm., gives vital capacity 4052 c.cm.

* Being a Preliminary Report to the Medical Research Council.

(Continued from previous page.)

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The mean of these two figures $\frac{(4001 + 4062)}{2} = 4031$ c.cm. is thus the calculated vital capacity derived from the observed measurements of trunk length and chest circumference. As the patient's observed vital capacity is only 2630 c.cm., his vital capacity is actually 34·8 per cent. below normal (e.g., − 34·8 per cent.).

Before giving in detail those cases in which the vital capacity has been examined on more than one occasion, we give a general analysis of the first 200 cases, which include many where the vital capacity has only been examined on one occasion.

Of these 200, four (Nos. 15, 77, 124, 140) were patients who had had pulmonary tuberculosis with T.B. in the sputum, but had lost the T.B. after sanatorium treatment. One of these (No. 77) was returned as − 7 per cent. Although at work and having no physical sign of active disease, he was easily tired and had not lost his cough. His illness began with hæmoptysis three years ago. One (No. 15) was − 8·5 per cent., and has since got worse (see Table IIA). The other two were returned as normal. Seventeen were cases believed to be healthy, and included some of the hospital staff sent as controls (without the knowledge of G. D.), and certain patients in hospital for observation, but in whom no evidence of disease was discovered. *All of these were returned as normal.*

One patient (No. 135) had been in a sanatorium for hæmoptysis, but no physical signs or T.B. have ever been found; the tuberculin test was negative, and there is no X ray evidence of lung disease. He was returned as normal.

Ten were cases of severe bronchitis (Nos. 4, 12, 50, 84, 94, 97, 142, 146, 181, 199). Their vital capacities varied from − 10·4 per cent. to − 35 per cent. Two were believed to have debility only, and one of these (No. 18), a boy of 18, showed a vital capacity of − 12 per cent. The other's (No. 172) vital capacity was − 6·6 per cent. (see Table III.). One (No. 180) with tuberculous glands was − 7·5 per cent. (see Table IV.). One (No. 153) suffered from neurasthenia and tachycardia, and was − 30 per cent. Six were boys of from 9 to 16 years of age, apparently free from tuberculosis, and of these one (No. 6), with no clinical evidence of disease, was − 7·8 per cent., but later improved to + 3·7 after hospital treatment. One (No. 7), aged 15, with no apparent disease, was − 12 per cent. One (No. 8), aged 13, is considered in Table IV. Two others (Nos. 19 and 191) are considered in Table III. The other (No. 98) is considered in Table IIB. (No. 85) A patient with tuberculous glands (see Table IIB). Two patients had pleurisy only—No. 150 (see Table IA) and No. 11 (see Table IIA). Three (Nos. 40, 131, and 166) died from pulmonary tuberculosis, their vital capacities being −45·8 per cent. four months before death in one case, − 71·9 per cent. six weeks before death in another, and −47·4 per cent. six months before death in the third.

The other 152 patients were definite cases of pulmonary tuberculosis; all were found to have a vital capacity of more than 10 per cent. below normal, except (1) No. 15 and (2) No. 55 (see table); (3) No. 115 (returned −9·4 per cent., early good case, which did well); (4) No. 139, (5) No. 150, (6) No. 157, (7) No. 164, (8) No. 168, (9) No. 178, and (10) No. 196 (see table).

In 116 cases the vital capacity has been taken on more than one occasion. It was found to increase by at least 2 per cent. in 44 cases. It was found to have decreased by at least 2 per cent. in 39 cases. It varied less than 2 per cent. in 27 cases. In the remaining 6 cases it varied—sometimes increased, sometimes decreased.

I.—*Cases in which the Vital Capacity has Increased.*

We will deal first with the 44 cases in which the vital capacity has increased by at least 2 per cent.

A. *Vital Capacity Increased by 2 per cent. or more but less than 10 per cent.*

1. No. 35. Male, aged 40. Infiltration one apex. Improved by hospital treatment and returned to work. Is now about stationary. Has fibrosis at the apex. T.B. +, but signs not spreading.

April, 1919 − 15·7	March, 1920 − 12·0
October, ,, − 11·6	

2. No. 53. Male, aged 42. Early signs L. apex. Improved in hospital. Can do light work. T.B. +.

May, 1919 − 23·3	February, 1920 − 15·6

3. No. 67. Male, aged 51. Advanced disease L. side. T.B. +. Getting rapidly worse. Artificial pneumothorax performed June, 1919. In bed for six weeks and then began to improve steadily. Is now at work and no T.B. Vital capacity has increased, although one lung is now completely collapsed.

May, 1919 − 34·8	March, 1920 − 34·8
October, ,, − 41·9	April, ,, − 32·8
January 1920 − 38·8	

4. No. 74. Female, aged 30. Advanced signs. Fibrosis taking place. Doing housework T.B. +.

May, 1919 − 39·1	March, 1920 − 36·9
September, ,, − 37·3	

5. No. 84. A delicate boy of 9. Chronic bronchitis and asthma No T.B. Keeping at school; much better during the present fine weather.

May, 1919 − 24·4	April, 1920 − 16·0
February, 1920 − 26·6	

6. No. 126. Female, aged 27. Infiltration R. apex. T.B. +. Improved at sanatorium. No T.B. now, and very few signs.

June, 1919 − 8·7	March, 1920 − 3·3

7. No. 148. Male, aged 30. History seven years. Fibrosis L. apex; worse recently. T.B. +. Improved considerably at sanatorium. Now at work.

June, 1919 − 16·4	March, 1920 − 7·5

8. No. 150. Male, aged 30. History of pleurisy. Signs of thickened pleura. No evidence of active pulmonary tuberculosis. Improved at sanatorium.

June, 1919 − 6·7	March, 1920 − 3·0

9. No. 175. Male, aged 39. Slight signs one apex. Improved in hospital. Now at work. T.B. +

September, 1919 − 21·1	March, 1920 − 15·0

10. No. 183. Male, aged 37. Considerable signs L. lung. Improved at sanatorium, and is now starting work again. Still T.B. +.

September, 1919 − 28·6	April, 1920 − 19·8
February, 1920 − 19·0	

11. No. 192. Female, aged 21. Advanced signs both lungs. Has not lost weight and is able to get about. Signs unchanged. T.B. +.

October, 1919 − 42·6	January, 1920 − 37·2

This case and No. 256 illustrate well how the general condition of patients may be improved by hospital treatment, even in advanced consumption.

12. No. 204. Boy, aged 17. Early signs L. apex. T.B. +. Improved at sanatorium. Still T.B. +

October, 1919 − 10·2	February, 1920 − 2·5
January, 1920 − 1·9	April, ,, − 3·0

13. No. 217. Male, aged 48. Slight signs one apex. History 8 months. T.B. +. Improved at sanatorium. Is now holding his own.

November, 1919 − 27·3	February, 1920 − 23·4
January, 1920 − 19·7	April, ,, − 20·7

14. No. 222. Male, aged 29. Infiltration R. apex. T.B. +. Slightly better, and is now in sanatorium.

January, 1920 − 21·5	March, 1920 − 19·4
February, ,, − 19·4	April, ,, − 18·7

In connexion with this case it is interesting to observe how very similar the vital capacity readings are. They were taken at intervals of a month, during the patient's hospital treatment, the last reading after 10 days at sanatorium. It well illustrates that vital capacity does not vary in the same individual without variation in health.

15. No. 223. Male, aged 36. History three years. One apex affected. Improved after two months' hospital treatment, January and February. Is now doing light work. T.B. +.

January, 1920 − 21·2	April, 1920 − 16·3

16. No. 230. Male, aged 23. Infiltration L. apex. T.B. +. Improving in hospital.

January, 1920 − 20·3	March, 1920 − 16·1

17. No. 234. Male, aged 42. Bronchitis. No T.B. and no signs of pulmonary tuberculosis. At work.

January, 1920, + 1·5	April, 1920 + 6·2

18. No. 238. Male, aged 28. Neurasthenia and debility. No signs in lungs.

January, 1920 − 3·7	April, 1920 + 3·3

19. No. 245. Male, aged 40. Slight signs and T.B. + in 1919. Left Frimley January, 1920. No T.B. now.

January, 1920 − 4·7	March, 1920 − 1·0

20. No. 256. Male, aged 48. Advanced case, recently had breakdown. Improved in hospital. T.B. +.

January, 1920 − 41·2	March, 1920 − 32·6

21. No. 258. Male, aged 40. Advanced signs left lung. T.B. + and pyrexia a year ago. Artificial pneumothorax performed May, 1919, and he is now better and working on a farm.

January, 1920 − 39·3	April, 1920 − 34·6

22. No. 262. Male, aged 19. Early signs one apex. T.B. +. Improved in hospital and is now in sanatorium.

February, 1920 − 15·2	April, 1920 − 5·8

23. No. 269. Female, aged 17. Early signs and T.B. + Improved in hospital and now in sanatorium.

March, 1920 − 9·5	April, 1920 − 7·5

24. No. 271. Male, aged 27. Acute infiltration R. apex. Improved and is now in sanatorium. T.B. +

March, 1920 − 26·4	April, 1920 − 21·3

25. No. 283. Male, aged 19. Acute infiltration one apex. T.B. +. Improved in hospital and is now at sanatorium.

March, 1920 − 23·6	April, 1920 − 18·3

In connexion with this series it is interesting to note that in no case do the vital capacity findings differ from the clinical observation of the patient.

B. *Vital Capacity Increased by more than 10 per cent.*

26. No. 6. Boy, aged 16. No definite signs. Now at full work.

April, 1919 − 7·8	February, 1920 + 3·7

27. No. 11. Boy, aged 17. In hospital for pleurisy. No T.B. Improved in hospital and went to sanatorium in June. Great improvement there and is now at work, feeling well.

April, 1919 − 25·1	January, 1920 − 5·6
May, ,, − 22·2	April, ,, − 4·2
October, ,, − 3·8	

28. No. 61. Male, aged 42. Acute disease and many signs. Improved considerably in hospital. T.B.+
May, 1919 – 49·9 | October, 1919 – 32·1

29. No. 63. Female, aged 23. Improved in sanatorium in July, August, September, last year. Now doing housework. T.B. +. One apex infiltration and fibrosis.
May, 1919 – 21·9 | January, 1920 – 10·5

30. No. 92. Female, aged 23. One apex. T.B. +. Great improvement. No T.B. now. No signs of activity.
May, 1919 – 25·0 | March, 1920 – 1·9

31. No. 127. Female, aged 25. Early infiltration R. and L. apices. No T.B. found. Great improvement in sanatorium. Now at work.
June, 1919 – 38·8 | March, 1920 – 5·6

32. No. 129. Female, aged 28. Early signs one apex. No T.B. found. Great improvement in sanatorium. No signs now.
June, 1919 – 12·8 | March, 1920 + 7·6

33. No. 158. Male, 33. Infiltration both lungs. Fibrosis and steady improvement in sanatorium. T.B. +.
September, 1919 – 31·8 | April, 1920 – 17·8
January, 1920 – 22·9

34. No. 161. Male, aged 41. Early infiltration one apex. No T.B. Great improvement in hospital. Now full work.
September, 1919 – 27·5 | April, 1920 – 2·2
January, 1920 – 17·5

35. No. 181. Male, aged 37. Signs of bronchitis only. No T.B. Improved in hospital. Now at work.
September, 1919 – 10·4 | March, 1920 + 2·3

36. No. 189. Male, aged 30. Slight sign R. apex. T.B.+. Improved in hospital and lost the T.B. In sanatorium until April, 1920. No T.B. and no signs of activity now.
October, 1919 – 12·6 | January, 1920 + 3·9
November, ,, + 4·6 | April, ,, + 11·7

37. No. 208. Male, aged 39. Infiltration one apex. Improved in sanatorium. Now light work. T.B.+.
October, 1919 – 33·5 | March, 1920 – 22·3

38. No. 210. Male, aged 38. Severe bronchitis. No T.B. found. Improved in hospital.
October, 1919 – 36·2 | March, 1920 – 24·5

39. No. 212. Male, aged 19. Early infiltration R. apex. T.B.+. Still in sanatorium. Great improvement.
November, 1919 – 12·6 | February, 1920 – 3·7
January, 1920 – 4·9 | April, ,, + 1·7

40. No. 213. Male, aged 37. History nine years. Fibrosis L. lung. Infiltration R. lung. Considerable improvement in hospital. T.B. +.
November, 1919 – 41·0 | January, 1920 – 25·0

41. No. 214. Male, aged 36. Early infiltration one apex. T.B. +. Improved in hospital and is now in sanatorium. Slight relapse in January with coloured sputum.
November, 1919 – 29·6 | February, 1920 – 19·1
January, 1920 – 16·2 | April, ,, – 13·3

42. No. 216. Male, aged 30. Bronchitis following influenza. No T.B. Improved in hospital.
November, 1919 – 18·6 | April, 1920 – 7·2

43. No. 221. Male, aged 28. Good general condition, but T.B. +. Signs L. apex and repeated hæmorrhages. Artificial pneumothorax done October, 1919, but signs noted on R. side and L. lung allowed to expand again February, 1920. Good progress now.
January, 1920 – 59·9 | April, 1920 – 35·7
February, ,, – 58·1

44. No. 261. Male, aged 30. Infiltration one apex. Recently had pleurisy. Improving and now in sanatorium. T.B. +.
February, 1920 – 30·8 | April, 1920 – 20·4

II.—*Cases in which the Vital Capacity has Decreased.*

A. *Vital Capacity Decreased by 2 per cent. or more but less than 10 per cent.*

1. No. 15. Male, 34. Signs L. apex. T.B. + at first, but no T.B. on leaving sanatorium, April, 1919. Since then not so well.
April, 1919 – 8·5 | October, 1919 – 12·0

2. No. 28. Male, aged 44. T.B. +. Infiltration R. and L. apices. Went to sanatorium, but left not so well after six weeks.
April, 1919 – 25·2 | February, 1920 – 30·2

3. No. 50. Male, aged 43. Bronchitis and emphysema. No T.B No clinical change in his condition.
May, 1919 – 13·1 | February, 1920 – 17·7

4. No. 64. Girl, aged 18. Many signs R. apex. T.B. +. Slowly getting worse.
May, 1919 – 18·0 | October, 1919 – 23·9

5. No. 93. Male, aged 50. Infiltration R. apex. T.B. +. Went to sanatorium, but made no improvement. Slowly getting worse.
May, 1919 – 17·3 | March, 1920 – 23·3

6. No. 97. Male, aged 36. Severe bronchitis and asthma. Getting worse, and unable to work.
May, 1919 – 40·1 | February, 1920 – 49·5

7. No. 121. Male, aged 53. Infiltration R. apex. Getting worse. T.B. +.
June, 1919 – 28·5 | February, 1920 – 33·9

8. No. 135. Male, aged 23. Left sanatorium in May, 1919. No signs found there, and T.B. never found. Was sent to sanatorium because of hæmoptyses. Since leaving he has had several more hæmoptyses, but T.B. never found. Tuberculin test negative. X ray shows no sign of lung disease. The clinical evidence, therefore, agrees that he is not tuberculous.
June, 1919 + 14·0 | March, 1920 + 7·8

9. No. 139. Male, aged 30. Indefinite signs. T.B. + a year ago, but no T.B. June, 1919, or now. Recently has been losing weight and feeling easily tired.
June, 1919 – 5·2 | April, 1920 – 7·4

10. No. 152. Male, aged 34. T.B. + a year ago. Improved in sanatorium, and is still keeping at work but feeling run down, and cough has returned. No T.B.
September, 1919 – 13·0 | March, 1920 – 18·5

11. No. 155. Male, aged 23. Infiltration R. and L. apices. T.B. +. Went to sanatorium, but made no progress.
September, 1919 – 30·5 | March, 1920 – 37·9

12. No. 157. Boy, aged 17. Slight signs L. apex. Hæmoptysis. Went to sanatorium, but made no progress. Left in February and has been worse since. T.B.+.
September, 1919 – 5·8 | March, 1920 – 12·6
January, 1920 – 4·9

13. No. 176. Male, aged 30. Indefinite signs and no T.B. at first. Definite signs developed and T.B.+. In sanatorium, but not doing well.
September, 1919 – 5·4. | February, 1920 – 12·7
January, 1920 – 7·7. | April, ,, – 11·0

14. No. 184. Male, aged 25. Early case, following pleurisy. Is now in sanatorium, but not doing well. T.B. +.
September, 1919 – 19·8 | April, 1920 – 25·0
January, 1920 – 23·0

15. No. 196. Male, aged 32. Left sanatorium September, 1919. Returned to full work. Cough returned during winter, and he became worse. Keeping at work. Indefinite signs. T.B. +.
October, 1919 – 5·1 | April, 1920 – 12·7
January, 1920 – 14·4

16. No. 211. Male, aged 44. Advanced signs L. lung. Artificial pneumothorax done May, 1919. Considerable improvement, and he went to sanatorium. Had influenza in March, and was in bed for three weeks. Improving again now. T.B. +.
November, 1919 – 54·8 | April, 1920 – 60·2
January, 1920 – 51·8

17. No. 244. Male, aged 31. Infiltration R. apex. Is now in sanatorium, but not improving. T.B. +.
January, 1920 – 20·6 | February, 1920 – 24·5

B. *Vital Capacity Decreased by 10 per cent. or more.*

18. No. 21. Male, aged 35. Infiltration one apex. T.B.+. Went to sanatorium but left in September, 1919, having made no progress and is now much worse.
April, 1919 – 20·6 | February, 1920 – 36·9

19. No. 22. Male, aged 62. Infiltration both apices. T.B.+. Getting worse and signs extending.
April, 1919 – 18·0 | February, 1920 – 33·6

20. No. 24. Boy, aged 18. Early signs left apex. Spread to R. lung. Now advanced signs both lungs. T.B.+.
April, 1919 – 13·0 | April, 1920 – 40·6
January, 1920 – 37·5

21. No. 41. Male, aged 39. Out-patient. Advanced signs. Much worse. T.B.+.
April, 1919 – 32·9 | April, 1920 – 57·4

22. No. 52. Boy, aged 19. Early infiltration. T.B. +. Went to Frimley and got much worse. Now in bed at home.
May, 1919 – 11·1 | February, 1920 – 27·9

23. No. 54. Male, aged 34. Extensive signs left lung, following pleurisy. T.B. +. Got worse, but went to Frimley and held his own. Not doing well.
May, 1919 – 23·7 | April, 1920 – 35·3
January, 1920 – 40·1

24. No. 55. Boy, aged 18. Early signs R. apex. Disease spreading rapidly. T.B. +.
May, 1919 – 8·2 | September, 1919 – 23·0

25. No. 58. Male, aged 39. Long history. T.B.+. Active signs R. lung.
May, 1919 – 29·1 | May, 1920 – 40·0
February, 1920 – 36·6

26. No. 62. Male, aged 33. Advanced disease. Attending out-patients and steadily getting worse. T.B.+.
May, 1919 – 48·1 | March, 1920 – 62·1
October, ,, – 53·9

27. No. 78. Male, aged 31. Hæmoptysis and signs L. apex. T.B.+. Artificial pneumothorax done March 1919. Apparently holding his own and no T.B. now.
May, 1919 – 40·5 | March, 1920 – 50·7
October, ,, – 49·0 | April, ,, – 51·8

28. No. 79. Female, aged 30. Signs R. and L. lungs. Getting worse. T.B.+.
May, 1919 – 21·0 | October, 1919 – 35·7

29. No. 85. Boy, aged 16. Tuberculous glands of neck and old peritonitis. In February, 1920, he was clinically better. Is now in sanatorium.
May, 1919 – 7·7 | February, 1920 – 17·9

30. No. 98. Boy, aged 13. Debility, but no sign of organic disease. Is still attending school. Looks very delicate, but no definite physical signs.
May, 1919 + 2·2 | April, 1920 – 8·5
February, 1920 – 3·0

31. No. 107. Boy, aged 18. Signs R. and L. lungs. Poor condition and T.B. +, though just returned from sanatorium, May, 1919. Since then getting steadily worse.
May, 1919 – 25·2 | February, 1920 – 40·4
October ,, – 35·5 | April ,, – 39·4

32. No. 168. Male, aged 29. Early infiltration R. apex. Went to sanatorium but failed to improve. Since leaving in January he has been much worse. T.B. +.

September, 1919 – 5·6	March, 1920 – 20·1
January, 1920 – 9·7	

33. No. 171. Male, aged 26. Indefinite signs. T.B. +. Went to sanatorium but made no improvement. Since leaving in November, he became worse. Definite signs at R. apex now found.

September, 1919 – 7·6	April, 1920 – 23·4

34. No. 178. Male, aged 20. Slight signs L. apex. T.B. +. Went to sanatorium but became much worse. Now living at home and not working.

September, 1919 – 2·2	March, 1920 – 25·7
January, 1920 – 25·7	

35. No. 205. Male, aged 30. Extensive disease spreading quickly in left lung. T.B. +. Artificial pneumothorax done in October, 1919, since when his temperature has been normal, but he is slowly losing ground.

October, 1919 – 22·2	March, 1920 – 46·7
January, 1920 – 42·1	

36. No. 229. Male, aged 51. Extensive signs. Much worse. T.B. +.

January, 1920 – 39·2	April, 1920 – 59·4

37. No. 251. Male, aged 30. Extensive signs left lung. T.B. +. Pyrexia and signs spreading. Artificial pneumothorax done in March, since when he has improved.

January, 1920 – 38·2	April, 1920 – 64·1

38. No. 252. Male, aged 46. Signs both lungs. T.B. +. Much worse.

January, 1920 – 44·4	April, 1920 – 58·6

39. No. 254. Male, aged 23. Signs both lungs. T.B. +. Much worse and now bedridden.

January, 1920 – 38·9	April, 1920 – 70·6

III.—*Cases in which the Vital Capacity has Varied by less than 2 per Cent.*

1. No. 5. Male, aged 39. Fibrosis L. lung. T.B. +. Clinically, slightly worse and going down-hill. Not working, attending out-patients.

April, 1919 – 50·0	February, 1920 – 50·6

2. No. 19. Schoolboy, aged 13. No definite physical signs. Looks delicate and has dyspnœa. X ray evidence of bronchial glands.

April, 1919 – 23·1	April, 1920 – 23·6
February, 1920 – 27·5	

3. No. 27. Boy, aged 18. Acute infiltration left lung and slight R. T.B. + following influenza. Improved in hospital and sanatorium, but is now unable to work.

April, 1919 – 39·2	February, 1920 – 39·2

4. No. 57. Male, aged 45. Infiltration R. and L. lungs. Improved in sanatorium and is now attending out-patients. T.B. +.

May, 1919 – 63·3	February, 1920 – 61·9

5. No. 76. Girl, aged 18. Extensive fibrosis. Condition stationary. T.B. +.

May, 1919 – 35·7	February, 1920 – 33·8

6. No. 89. Female, aged 21. Acute signs R. and L. lungs. Settled down and now able to get about. T.B. +.

May, 1919 – 33·5	February, 1920 – 32·5

7. No. 106. Male, aged 45. Previously T.B. +. Now signs of fibrosis, but no T.B. Keeping at work. Disease apparently stationary.

May, 1919 – 30·1	February, 1920 – 29·5

8. No. 145. Boy, aged 14. No signs of disease. Keeping fit and at school.

June, 1919 – 0·1	March, 1920 – 1·0

9. No. 147. Male, aged 31. No clinical evidence of disease.

June, 1919, + 6·1	March, 1920 + 4·0

10. No. 149. Male, aged 40. Indefinite signs. T.B. never found. Keeping well.

June, 1919 – 2·5	March, 1920 – 1·0

11. No. 156. Male, aged 19. No definite signs. No T.B. Keeping well.

September, 1919 – 3·7	March, 1920 – 1·7

12. No. 172. Man, aged 26. Delicate and occasional evening pyrexia. No definite signs and no T.B. found.

September, 1919 – 6·6	February, 1920 – 4·3
January, 1920 – 16·1	April, ,, – 6·6

In this case the patient had been in bed with mild influenza in January.

13. No. 179. Male, aged 28. Infiltration R. apex. T.B. +. Holding his own.

September, 1919 – 17·0	March, 1920 – 18·3

14. No. 185. Male, aged 23. T.B. +. Infiltration both apices. No change.

September, 1919 – 33·5	January, 1920 – 33·7

15. No. 190. Male, aged 54. Chronic case. Fibrosis R. lung. T.B. +. Keeping at work.

October, 1919 – 13·5	April, 1920 – 12·9
January, 1920 – 14·5	

16. No. 191. Boy, aged 11. No definite signs of disease.

October, 1919 – 8·8	March, 1920 – 6·1

17. No. 209. Male, aged 29. Slight infiltration left apex. No T.B. Delicate, and disease apparently now arrested.

October, 1919 – 12·2	April, 1920 – 12·5
January, 1920 – 20·5	

18. No. 219. Male, aged 30. No definite signs and good general condition. T.B. +.

January, 1920 + 13·9	April, 1920 + 15·0

19. No. 227. Boy, aged 18. No physical signs.

January, 1920 – 1·2	March, 1920 + 0·3

20. No. 228. Male, aged 41. Slight fibrosis base of one lung. No T.B. Well and at work.

January, 1920 – 1·4	April, 1920 – 0·9

21. No. 236. Male, aged 30. Infiltration both lungs. T.B. +. Just gone to sanatorium.

January, 1920 – 40·6	February, 1920 – 39·4

22. No. 239. Male, aged 39. Few signs L. apex. T.B. +. Just gone to sanatorium.

January, 1920 – 12·5	April, 1920 – 13·8
March ,, – 10·4	

23. No. 246. Male, aged 27. Infiltration both lungs. T.B. +. No change.

January, 1920 – 42·6	March, 1920 – 41·0

24. No. 255. Male, aged 26. Early case. Infiltration R. apex. T.B. +. Just gone to sanatorium.

January, 1920 – 6·9	February, 1920 – 7·9

25. No. 257. Male, aged 51. Chronic case. Artificial pneumothorax for over two years. Stationary condition.

January, 1920 – 48·4	April, 1920 – 46·7
March, ,, – 46·9	

26. No. 266. Male, aged 28. Infiltration R. apex. T.B. +. No apparent change.

February, 1920 – 24·0	April, 1920 – 23·4

27. No. 267. Male, aged 25. Indefinite sign. At sanatorium. No T.B.

February, 1920 – 1·5	April, 1920 – 0·3

IV.—*Cases in which the Vital Capacity Varied—sometimes Increased, sometimes Decreased.*

1. No. 8. Boy of 13. Delicate, and has had pleurisy. No definite physical signs, and his condition was apparently the same on all three examinations.

April, 1919 – 25·1	April, 1920 – 21·0
February, 1920 – 30·2	

2. No. 25. Male, aged 42. This patient was bedridden. T.B. +. Extensive signs R. lung, for which an artificial pneumothorax was done in March, 1919. After this he improved, and is still able to get about. Clinically his condition is much better than in April, 1919, but about the same as, or slightly worse than, in October, 1919.

April, 1919 – 59·7	March, 1920 – 56·1
October, ,, – 26·9	

3. No. 37. Female, aged 21. Extensive signs both lungs with fibrosis. She improved in sanatorium, which she left in August, 1919. Apparently holding her own since. T.B. +.

April, 1919 – 22·2	March, 1920 – 21·0
September, ,, – 14·9	

4. No. 180. Male, aged 24. Enlarged glands of neck. No other evidence of tuberculosis. Keeping well and at work. No clinical reason for variation in vital capacity.

September, 1919 – 7·5	April, 1920 – 6·8
March, 1920 – 21·1	

5. No. 207. Male, aged 31. Very advanced signs one lung. T.B. +. Artificial pneumothorax March, 1920, since when he was able to get about, and is apparently holding his own.

October, 1919 – 56·1	March, 1920 – 45·7
January, 1920 – 36·5	

6. No. 215. Male, aged 39. Infiltration R. and L. lungs. T.B. +. History two years. Apparently remaining stationary.

November, 1919 – 42·1	February, 1920 – 40·3
January, 1920 – 30·6	April, ,, – 31·7

Conclusions.

From the careful analysis of the cases given in detail above, the following conclusions seem to be justified.

1. In cases of pulmonary tuberculosis there is a definite decrease in vital capacity as compared with what should be normal for any individual, taking into account the class in which this individual should be placed according to occupation and mode of life.

2. An improvement in the clinical condition of the patient is found to be accompanied by an increased vital capacity, while an advance of the disease results in a decrease in vital capacity. The vital capacity, therefore, gives a valuable quantitative measure of the benefit, if any, which a patient receives as the result of treatment.

3. The determination of the vital capacity is useful for the classification of cases of pulmonary tuberculosis, because it is possible by this means numerically to express the injury to health (e.g., degree of toxæmia) which otherwise would depend on the individual interpretation of physical signs by different observers. In this connexion it should be noted that classification by physical signs alone may place a patient nearing death from an acute lesion in a high category, while another

patient, with satisfactory fibrosis and extensive cavitation, likely to live for several years, may be placed in the lowest category.

4. As an aid to diagnosis a single or repeated examination of the vital capacity of doubtful cases will also prove useful. If a normal vital capacity is found in such cases, the patient is most unlikely to be suffering from pulmonary tuberculosis, whereas if the vital capacity is much decreased the patient should be suspect, though it must always be borne in mind that other diseases may also cause a lowering of the vital capacity.

5. Finally, a systematic study of the vital capacity in its proper relationship to body size has given important information as to the beneficial effects of different treatments of pulmonary tuberculosis, and has made it possible to distinguish quantitatively the degrees of improvement.

Our thanks are due to Dr. J. J. Perkins and other members of the staff of the Brompton Hospital, who kindly have placed their cases at our disposal for this investigation. We also wish to thank Dr. F. G. Hobson, D.S.O., and Mr. G. F. Hanson, late Lieutenant, U.S.A. Medical Air Service, for kind help in various ways.

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BLOOD TRANSFUSION: ITS THEORY AND PRACTICE.[1]

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SINCE the end of the war there has ceased to be any pressing need for doing blood transfusion on a large scale, and its great importance has therefore tended to fall into the background. However, it constitutes one of the biggest advances that has resulted from the practice of military surgery, and it is thus desirable that knowledge of the methods employed should be diffused as widely as possible.

Probably few lectures on blood transfusion given have been without a reference to the transfusion supposed to have been performed in 1492 upon Pope Innocent VIII., the authenticity of which must, however, be discredited. It is, on the face of it, improbable that a blood transfusion should have been attempted before the discovery, about 1616, of the circulation of the blood. The truth is that in order to restore the Pope's health three boys were bled to death and a draught prepared from their blood, but that this failed of its effect. It is of much greater interest to notice that in Sprat's History of the Royal Society, 1667, it is recorded that the versatile Sir Christopher Wren "was the first Author of the Noble Anatomical Experiment of Injecting Liquors into the Veins of Animals. By this Operation divers Creatures were immediately purg'd, vomited, intoxicated, kill'd, or reviv'd according to the quality of the Liquor injected. Hence arose many new Experiments, and chiefly that of Transfusing Blood, which the Society has prosecuted in sundry instances, that will probably end in extraordinary Success." In my own copy of the book an eighteenth century hand has written large in the margin "It failed," and that was the fate of most subsequent attempts. It has been left for a later age to achieve the "extraordinary success" predicted two and a half centuries ago.

Indications for Blood Transfusion.

It is first necessary to consider what are the indications for blood transfusion; these may be stated shortly as (1) collapse due to any sudden and severe loss of blood, with or without the additional collapse-producing factor introduced by "shock"; and (2) anæmia due to slow and prolonged loss of blood corpuscles by hæmorrhage or by pathological destruction.

It was unusual during the war to meet with patients who were in danger of their lives from loss of blood alone without the presence of traumatic shock, but such cases did occur, and they will also be met with in civil practice—as, for instance, in attempted suicide by throat cutting, in gastric ulcer with severe hæmatemesis, in secondary hæmorrhage after operation, and in hæmophilia. The more typical condition following war wounds—hæmorrhage with traumatic shock—will be faithfully reproduced in the victims of train or street accidents, in patients who have undergone certain severe operations, and in women suffering from post-partum hæmorrhage or a ruptured ectopic gestation.

The signs and symptoms of acute anæmia need not be detailed here, though it may be mentioned that the "amaurosis" of the text-books is not a symptom that is commonly met with in practice. The signs that are of the most use are the pulse-rate, the blood pressure, and the hæmoglobin content. It has been stated that a blood pressure below 70 mm. of mercury is scarcely compatible with life, but this is not in accordance with experience. It was common in France to meet with blood pressures below 45 mm., so low, in fact, that they could scarcely be measured, but many patients whose lives had reached even so low an ebb as this were quickly restored by the administration of blood, provided that the exsanguined state had not lasted for too long a time. It is doubtful how far blood transfusion is of use in the treatment of shock unaccompanied by hæmorrhage, since the condition here is largely one of an increased viscosity of the blood with accumulation of the corpuscles in the capillaries. Should blood transfusion be proved to have more effect than other restoratives it will be administered in much smaller quantities than are necessary for the treatment of hæmorrhage. Blood transfusion has been found of the greatest service in the treatment of hæmophilia, for not only can the blood lost be thus replaced, but also it is found that the introduction of the normal blood temporarily confers upon the patient's blood the power of coagulation, so that the bleeding ceases. This effect is not interfered with by the presence of an anticoagulant in the transfused blood. Evidence is accumulating that blood transfusion can be used with good effect in pernicious anæmia, and there is little doubt that blood is destined to be an important therapeutic agent in the treatment of blood diseases.

The Quantity of Blood to be Given.

In considering how much blood should ordinarily be given in the treatment of acute anæmia, experience is a safer guide than any theoretical considerations.

It is difficult to estimate accurately the total quantity of blood in the body of an adult, but it has been variously stated by physiologists to be from seven to ten pints. It is still more difficult for obvious reasons to estimate how much blood a man can lose and yet remain alive. This will depend partly on the power of physiological accommodation possessed by the individual in his vaso-motor system and tissue fluids, and partly on the rapidity with which the bleeding takes place. Under certain circumstances it is better that the bleeding should be at first more rapid than can be compensated for by these processes, for the immediate syncope which results produces so great a fall in blood pressure that hæmorrhage almost ceases, with the result that a clot forms in the lumen of the divided vessel. Experience shows us that hæmorrhage may take place into the peritoneal or the pleural cavities to the extent of three pints or more, and it may be stated as a rough guess that four pints, or possibly as much as half the total blood volume, may be lost without immediate death resulting. It is interesting to find that in the treatment of hæmorrhage it is not necessary to administer an amount of blood even approaching these quantities, for in most cases the balance between the volume of the circulating blood and the output of the heart is sufficiently restored by the administration of 650 to 1000 c.cm. of blood. Further fluid can then be given by the mouth or by the rectum. It may sometimes happen that a patient already in extremis from loss of blood needs a severe operation, and in such a case two transfusions of 800 c.cm. each may be given with advantage, the first to revive the patient, the second to combat the additional shock and hæmorrhage caused by the operation. The gum-arabic solution, which was introduced in the last year of the war as a substitute for blood, did not in practice altogether justify the hopes that had been founded on the good results obtained in the laboratory; it is certainly better than the normal or hypertonic saline formerly used for transfusion, but blood, when obtainable, is still better.

Relative Importance of Corpuscles and Serum.

The mention of gum introduces the question as to whether it is the corpuscles or the serum that is the more important constituent of the transfused blood.

Doubt has been expressed as to whether the transfused corpuscles carry out their function as oxygen carriers in the recipient; but since it has been proved that the corpuscles of transfused blood can both live and keep their

[1] The substance of two clinical lectures delivered at the Professorial Surgical Unit, St. Bartholomew's Hospital.

normal appearance for more than 30 days in the recipient's circulation, it seems reasonable to suppose that they are functional. Permanent restoration of blood volume is undoubtedly the chief result to be aimed at, but the physiological functions of all the constituents of the transfused fluid cannot be regarded as unimportant. It is possible that the foreign blood has the power of stimulating the regeneration of blood cells and of restoring the tone of the body generally, but this is a subject which demands further investigation.

"*Blood Groups.*"

Much has been written during the past two years on the division into "blood groups" and its practical application.

For practical purposes human beings have been divided into four groups, according to the agglutinating reaction of their bloods, and this has eliminated the fatalities which used to result from transfusion with blood which is incompatible with that of the patient. There can seldom be any reason at the present time for performing a transfusion without first testing the donor for his blood group, since the sera of Groups II. and III. can always be kept in stock and the test of donor and recipient performed in a few minutes.[2] Some operators have preferred to use a donor of the same group as the recipient rather than a member of Group IV., the so-called "universal donors"; but there is no evidence that this confers any advantage. It is true that the serum of Group IV. agglutinates the corpuscles of all the other groups outside the body; theoretically this is an objection to the indiscriminate use of Group IV. for transfusion, but as no ill-effects result such agglutination presumably does not occur in the body. This is interesting, because the amount of transfused blood is considerable relatively to that in the patient, and it must be presumed that the changes which occur in the body are different from those obtained outside it. It has been suggested that the agglutinin is inactivated by the recipient's serum. The blood groups depend upon differences in individuals, which are presumably inherited in a definite manner, since their numbers are found to maintain a constant proportion in any large population. Although there seems to be some racial variation in the distribution of the blood groups, no physiological advantage, such as immunity to disease, has been demonstrated in connexion with them, and it would therefore be expected that inheritance would be carried on without the interference of natural or artificial selection. Blood groups have been found among some animals, such as dogs, but others, such as rats and mice, do not seem to possess them. Some authorities have even stated that a baby does not show its characteristic blood group for the first two years of its life, but gives the same reaction as its mother. This does not agree with my own observations, which have shown that a baby may be of a different group from both its mother and father immediately after birth, and that the group does not change as the child grows older.

The choice of a donor will therefore depend primarily upon his belonging either to Group IV. or to the same group as the recipient. It is necessary to make very careful inquiries for any history of a communicable blood disease, such as malaria or syphilis, in the donor; his Wassermann reaction should be tested if possible. The effect on the donor of the withdrawal of blood is never more than a transient faintness and varies very much with the individual. One man, large and robust looking, may become faint after losing 400 c.cm. or less; another, to the eye less physically fit, may part with 1000 c.cm. and show no signs whatever. The effect probably depends more on the donor's mental attitude towards the process than on the amount of blood lost.

Disadvantages of Methods of Transfusion Formerly Used.

All the earlier methods of transfusion depended on the direct transference of blood from the donor's arterial system to a vein of the recipient; but this process presents several disadvantages, the chief of which is the impossibility of knowing how much blood has been transfused. The technical difficulties, too, are very great, even with the help of various ingenious devices, and the method is now chiefly of historical interest.

A great improvement was introduced by the "paraffin-tube" method, the blood being allowed to run from the donor's vein into a vessel coated on the inside with paraffin, and being transferred at once to the recipient. This method allows of measurement of the amount of blood transfused, and the blood can be given without the admixture of any foreign substance, but other objections remain, the chief of which are the great difficulty of carrying out the process of paraffining a glass vessel quite perfectly, the absolute necessity for injecting the blood into the recipient immediately after it has been drawn, and the fact that an open operation to expose the vein of the donor cannot be avoided. The ideal method of blood transfusion seems to me to require that it shall be absolutely certain of success, that the blood need not be injected immediately, so that other circumstances besides the demands of the transfusion may be allowed for, and that no injury shall be done to the donor beyond the puncturing of a vein. In addition to this the method should be so simple and free from special apparatus that it can be easily learnt and carried out by one operator without skilled assistance. Blood transfusion is a life-saving operation which should be capable of being carried out in a hospital by a house surgeon at the shortest notice, and an extensive experience should not be necessary in order to ensure success.

The Citrate Method.

All these requirements are fulfilled by the citrate method, and it is, I think, the method which should be taught at the present time.

The blood can be drawn with the minimum amount of injury to the donor; when drawn it can be put on one side, for several hours if necessary, and then given to the patient at whatever may be judged to be the best moment; the whole process can be carried out by a single operator unaided; and, finally, but little practice is needed to make success certain every time. The sodium citrate, with which the blood is mixed, forms a soluble compound with the blood calcium, which is thereby rendered inert as regards the coagulation reaction. It may be objected that sodium citrate is a toxic substance, and should therefore be avoided, but the amount used is not large enough to produce any appreciable reaction in most patients. I have been in the habit of using 160 c.cm. of a 3·8 per cent. solution as was originally recommended by Robertson for any quantity of blood up to a litre; this amount may err on the side of excess, and it has been recently stated that 100 c.cm. of a 3·8 per cent. solution is enough.

Description of Apparatus and Technique.

The transfusion apparatus known as "Robertson's bottle," first described by Oswald Robertson in 1918, is

FIG. 1.—Needle used for blood transfusion (full size). The bore should be 2 or 3 mm.

the basis of most citrate methods. I soon found that it could be modified in the direction of simplicity, since in drawing the blood there is no necessity to create a negative pressure if a needle of a large enough bore (2 or 3 mm.) be used. (Fig. 1.)

The needle should be kept ready for use in liquid paraffin, and after use should always be re-sharpened on a bevelled hone. When the donor's arm has been congested and a suitable vein chosen (usually the median basilic), the area of puncture is infiltrated with novocain; it is then only necessary to make a tiny cut in the skin with the point of a scalpel and to push the needle through into the vein. The blood is then allowed to flow through a rubber tube, which hangs freely into a flask (Fig. 2) containing the citrate, and as it flows in it is thoroughly mixed with the citrate by gently swinging the flask. It is convenient to use a graduated conical flask provided with a side tube and holding about a litre.

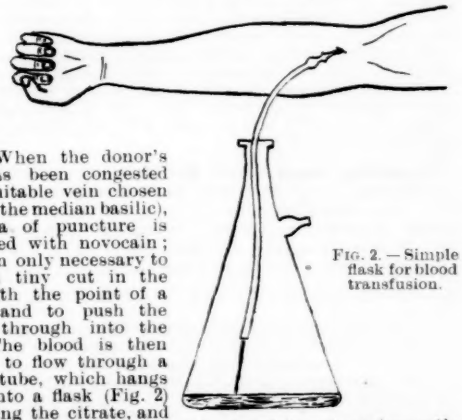

FIG. 2.—Simple flask for blood transfusion.

If a properly adjusted tourniquet is kept on the donor's arm while he works his forearm muscles by clasping and unclasping his hand a flow of blood is obtained which is fast enough to prevent clotting in the needle, and, indeed, quite

[2] For a tabulation of the groups and their reactions see an article by A. Fleming, F.R.C.S., and A. B. Porteous, M.B., in THE LANCET for June 7th, 1919.

as fast as most donors can stand. Blood up to 1000 c.cm. can be collected in this way in 10 to 20 minutes.

As an additional precaution a few drops of paraffin may also be run through the rubber tube before drawing the blood. The flask of citrated blood can then be stood in a basin of warm water and put on one side until wanted or taken to the patient's bedside. When the needle has been withdrawn from the donor's vein, slight pressure must be maintained for a few minutes on the puncture with a swab to prevent any bleeding, but no suture is needed.

In the administration of the blood it is usually best to expose the median basilic or saphenous vein in the patient by an open operation. If the case is one of hæmorrhage or shock the patient's veins will be collapsed, and the direct introduction of a needle will sometimes be found difficult.

In giving the blood I have found it of great advantage to fix on the delivery tube of the flask an air-lock, as shown in Fig. 3. The barrel of this air-lock, with a rubber tube and cannula attached, is first filled with normal saline solution and the tube near the cannula is clipped. The cannula is then inserted in the patient's vein and tied in. The barrel is fitted on to the rubber bung through which the nozzle of the delivery tube projects, the clip is released, and slight positive pressure is produced in the flask by means of a rubber bulb attached to the side tube. The citrated blood rises in the delivery tube, displacing the saline solution in the air-lock to a lower level, and then flows from the delivery tube into the air-lock, displacing the rest of the saline solution, and so into the patient's vein. The introduction of the air-lock has two advantages: in the first place, it allows of the cannula being filled with saline, so that during the insertion in the vein there is no leakage of blood which would obscure the operation; in the second place, it is easy to regulate with nicety the time occupied in giving the blood and to be quite sure that it is flowing properly. If the patient is suffering from acute anæmia, 750 c.cm. of blood may be given in the course of 20 minutes; but if the condition is one of chronic anæmia due to a slow continuous oozing, the blood must be given much more slowly. It is dangerous in such cases to increase the blood volume rapidly, and three-quarters of an hour must be occupied in giving 500 c.cm.; even then the patient may complain of a feeling of tightness in the chest and dyspnœa, due to embarrassment of the right heart, during the transfusion. The apparatus can also be used with advantage in giving saline solution or gum.

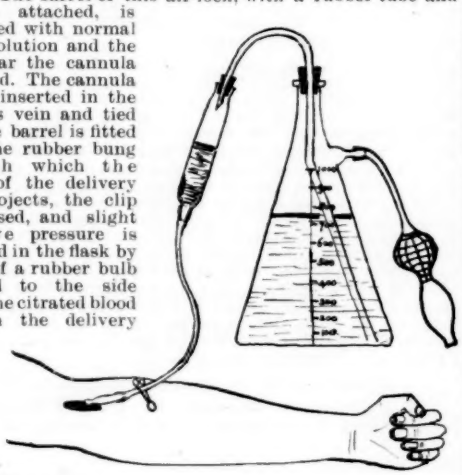

FIG. 3.—Showing air-lock in delivery tube of transfusion apparatus.

This technique is simple and straightforward at every stage, and can be easily demonstrated and learnt. Wide-bore needles (2 mm.) and a bevelled hone can be obtained from the General Surgical Company, Ltd., 147, Farringdon-road, London, E.C. The rest of the apparatus can be improvised in any laboratory.

FINANCIAL NEEDS OF DORSET HOSPITALS.—Dorset is the first county to have held a conference on the question of hospital requirements and the need for the continuance of the voluntary system. Lord Shaftesbury presided at the meeting, and it was stated that most of the institutions had an unfavourable balance. Sir Napier Burnett, formerly War Office hospital expert, stated that Dorset was not badly off as regards hospitals and the financial support accorded to them. Allusion was made to the fact that there were three hospitals "overlapping" at Weymouth, one of them having a deficit of £7000, and it was suggested that a conference of representatives of these three hospitals with the townspeople of Weymouth should be arranged and a scheme of coöperation formulated.

A STUDY OF CERTAIN
EFFECTS OF OCCUPATION AND RACE
ON THE HEALTH OF RECRUITS.

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UNTIL conscription was applied men were never examined in large quantities taken out of a specified area of the nation. Now statistics can be applied over a given area to all men between 18 and 42; to all classes of life and occupation; to those well or considered well, though with defects of minor degree; and to the really ill or decidedly defective. For example, there must be about 2 million men whose feet are more or less defective who could probably have been cured under a State Medical Service supervising their growth. Few people, again, have any idea as to the grave neglect of skin hygiene and its far-reaching effects. The surprisingly high categories in which clerks were placed shows that this occupation need not be unhealthy; while the absolute ill-health of the Russian Jews as a whole, and the close approximation of Jewish lads of 18 born abroad, but reared in Britain, to the British standard at the same age, proves there is nothing radically wrong with the physique of the Jewish race.

Heart Cases and Complexion—Racial Type.

But it is in the heart statistics that the examination of a block of the population should give really interesting results. The opportunity to collect them has never occurred before. The minor cases do not come for treatment, since it means losing wages, or they attend for some other ailment and resent a complete examination.

An analysis of 2500 heart cases was made from among my own cases, men I was asked to see by other examiners, and recruits who stated they had heart trouble. Of these 40 per cent. only have what is popularly known as heart disease, that is V.D.H., or excessive myocardial change. The illness of 50 per cent. was due to want of tone and minor causes, nearly all quite curable if the people concerned had been in a good financial position. In other words, many of these will drift into invalidism and national inefficiency for want of a fair chance. Another interesting feature is the proportion of dark to fair people who figure in this list. Of the 2500 heart cases, the proportion of dark to fair was as 3 to 2, and since among the other recruits examined there were two fair to every one dark, heart trouble would appear to be three times as common amongst the dark elements. As regards hyperthyroid action the dark are affected in the proportion of 10 to 1.

Feet, Genitalia, Teeth, Clothing, Body-weight.

The conditions of feet, genitalia, teeth, and clothing of 8000 recruits were all personally examined. The *feet* were defective in 23·8 per cent. I consider at least 18 per cent. of these feet defectives would have been curable had they been taken early enough to a medical man. The main causes operating in early life are badly fitting boots, with the great toe forced away from its proper line, and insufficient nourishment, with over-strain during adolescence. These cases usually became flat-footed.

The *teeth* were bad, in a state affecting health in 42·5 per cent. of these recruits. The standard adopted was: (1) A deficiency of teeth, either actually causing ill-health or bound to do so at middle age, or earlier, if dentures were not supplied. (2) The presence of large dentures, which was taken to imply a spell of ill-health, usually chronic sepsis, in the years before they were obtained. (3) Sepsis, with or without loss of teeth.

The *genitalia* were not normal in 14·6 per cent. of these 8000 recruits, but 80 per cent. of the defects were nothing more serious than a varicocele. Having noticed from practice among primitive negroes that quite 1 in 3 of the younger men had some definite defect, usually due to phimosis, soft chancre, or gonorrhœa, it occurred to me to take this opportunity of making a racial comparison.

Varicocele amongst our recruits, usually of quite a minor character, and in some cases disappearing with the colder weather, accounted for four abnormalities out of five. It occurred rarely amongst primitive negroes; my belief is that it is caused when the patient is in a state of general atonia by pressure of clothing; not directly, but by pressure on the right side, transmitted to the left cord.

It was found on local inquiry that two out of three of our population put on a vest or shirt (if no vest is used) once a week, usually on Sunday, and never take it off until the next Sunday. Medical men who have lived abroad in the tropics know the vital need of keeping the skin at its highest point of efficiency, as vital a need as to wash an infant daily. Neglect of skin hygiene in the tropics soon means acute disease; here it not only means "chills," rheumatic fibroses, pulmonary attacks as acute reminders of neglect, but an unhealthy dry condition, which I am convinced is responsible for nearly all the early arterio-sclerosis not due to infections. Twenty years of industrial practice had made me convinced of the existence of these unhygienic habits, but the opportunity to get definite figures was absent until now.

In 70 per cent. of a group of 2618 men something abnormal was noticed in the throat. In most cases it was only congestion of the soft palate or of the pharynx, usually attributable to colds, smoking, or sepsis from the teeth sockets. But a considerable number had had nasal obstruction of one kind or other, and a definite group had lesions referable to middle-ear disease through the Eustachian tube.

Of 10,000 consecutive recruits examined 105, or 1·0 per cent., were under 100 lb. (7 st. 2 lb.) in weight, and 50, or 0·5 per cent., over 200 lb. (14 st. 4 lb.) in weight. There were put in C III. or rejected 44, or 0·4 per cent., as under weight, and 11, or 0·1 per cent., as too heavy; 191, or 1·9 per cent., were over 6 feet high, and 69, or 0·7 per cent., were under 5 feet high.

Classification in Relation to Occupation.

The classification of 1000 each of middle-class men, clerks, craftsmen, open-air workers not "craftsmen" gave the following results:—

—	Middle-class.	Clerks.	Crafts-men.	Open-air workers.
	Per cent.	Per cent.	Per cent.	Per cent.
A, B I., B II.* ...	62·2	66·5	62·8	65·0
C I., C II.†	7·9	12·5	19·7	18·9
C III., B III.‡ ...	20·7	15·1	9·2	8·1
Rejected	9·2	5·9	8·3	8·0

* Foreign service. † Garrison and labour at home. ‡ Sedentaries.

In the above table the following points stand out. The clerks show the best results, being highest in the foreign service group and lowest in rejections. But being taken in the Kingston-on-Thames area they were mostly of a special class, having wages high enough to be able to live outside of London.

The results of two half years' examinations at Kingston are here shown. The first half year ending June, 1916, refers to a time when the recruits largely came up voluntarily, there being an undue ratio of middle-class men. The second half year ended December, 1916, being principally a call up of the working classes, the best of whom had enlisted early in the war prior to conscription.

1st Half Year.

	Total.	%
General service	7,600	48·4
Field " at home	1,175	10·9
Garrison abroad	1,283	8·2
" home	407	2·6
Labour	1,758	11·2
Sedentary (B III. and C III.)	1,787	11·3
Rejected	1,159	·4
	15,709	

2nd Half Year.

	Total.	%
A	7,383	29·0
B I.	4,731	18·5
II.	1,911	7·5
III.	347	1·4
C I.	3,698	14·5
II.	3,851	15·1
III.	2,165	8·4
Deferred	469	1·8
Rejected	978	3·8
	25,528	

Field service at home, garrison abroad, and a certain part of labour ("fit for labour abroad") of the first half year nearly equalled B I., B II. (garrison and labour abroad), practically the same standards.

Of 20,141 recruits, 6·2 per cent., or 1248, were referred to the ophthalmic surgeon. Of these he rejected 2·5 per cent., or 31. In three cases out of five the ophthalmic surgeon gave the same grade in eyesight as the recruit had already been placed in for general physique; and nearly all rejections were from the low physical grades.

Differential Results in Racial Grading.

The following table was made up of recruits of different nationalities, all of military age (18–42).

Grade.	British.	Russian Jews.	Italians.
I.	48·4	14·2	17
II.	21·7 (70·1)	16·2 (30·4)	18
III.a.	8·0	23·1	28
III.b.	3·2 (11·2)	12·5 (35·6)	12
III.c.	11·3	10·6	12
Deferred	7·4	4·4 (23·4)	7
Rejected		19·0	6

Since the figures refer to 15,709 British, 1000 Russian Jews, and only 100 Italians they are not strictly comparable, but may nevertheless be of interest. The British figures are taken from examinations in the Kingston district in the first half year of 1916 translated into the new gradings. Only a minority of the deferred would have been ultimately rejected. Since the best men had enlisted voluntarily the percentage of Grade I. is much lower than it should be. Foreign service men amounted to 70 per cent. Of the Russian Jews nearly 80 per cent. were sedentaries in occupation. A consecutive 1000 were taken, of whom 30 per cent. were fit for fighting units in physique, but not in mentality; 40 per cent. were fit for auxiliary service and labour; 30 per cent. had no military value. There had been no prior call up of the Russian Jews. Only 100 Italians were taken. Those left in England mostly followed sedentary occupations; the younger men had gone.

Boys and Youths.—The following statistics refer to boys and 18-year-old recruits:—

Grade.	Boys.	British, 18 years.	Russian Jews, 18 years.	Grade.	Boys.	British, 18 years.	Russian Jews, 18 years.
I.	86·8	72·1	67·5	III.c.	—	1·2	—
II.	10·3	15·1	16·2	Def.	—	3·1	2·5
III.a.	2·9	4·7	10·0	Rej.	—	2·5	3·8
III.b.	—	1·3	—				

Def., deferred. Rej., rejected.

The "boys" were 175 youths between 14 and 17 years 6 months, nearly all being over 16. The British youths of 18 comprised 2000 from 17½ years up to 19, the majority within three months of 18 on either side, but mostly over 18. The number in Grades I. and II. is only 10 per cent. under that of the boys so classified; I estimate that fair play in work, housing, and feeding would result in 85 per cent. being Grade I. Of Russian Jews of 18, 80 were taken over 17 and 6 months and under 19, no more could be obtained. These were all born in the Russian Ghettoes, nearly all of German extraction, and, brought to England in early life, had passed through our schools. Although handicapped, like their elders, by dwelling-house and workshop conditions, the difference between their grading and that of the adult Jews is most marked; in fact, it closely approached that of British lads of the same age. This proves that there is nothing radically wrong with the race. Out of over 1700 Russian Jews examined only 11 were volunteers.

The reasons for rejections amongst the 2000 youths were as follows: poor physique, 3; deformities, 6; epilepsy, 3; mental deficiency, 6; pulmonary tuberculosis, 14; other tubercle, 4; valvular disease of heart, 8; eye disease, 3; hernia, 1; syphilis, 1; chronic meningitis, 1; eczema, 1; total, 51. Under an efficient State Medical Service, which includes proper feeding where necessary, 30 of the above invalids, or 3 out of 5, should not occur.

The Russian Jews and the Racial Incidence of Disease.

The differential analysis taken from a consecutive 1000 Russian Jews shows the following results:—

—	Total.	Rejected.	Rejections caused by tuberculosis.
Tailors and auxiliary trades	520	17·2%	8·8%
All others	480	20·7%	8·9%

The above were the first 1000 of the younger men. As time went on the results as to tubercle became worse, until the final figures showed 12·5 per cent. rejected. The Russian Jews suffering from healed and latent tubercle in workshop employ were passed for army workshops.

The following table shows the racial incidence of disease, as recorded on recruits' medical history sheet, also some other facts. The numbers affording this table are: British, 1100; Russian Jews, 1370; in consecutive groups.

—	British.	Russian Jews.	Remarks.
Illiterates	2 (0·2%)	509 (37·1%)	
Eyes, colour	353 (32·1%) (not blue).	272 (20·0%) (not brown).	
5 ft. 6 in. and under	494 (44·9%)	1066 (77·8%)	Normal Englishman, 5 ft. 6 in.
Sedentary work ...	279 (25·3%)	1030 (75·2%)	
Over-stout	10 (0·9%)	72 (5·3%)	2 st. overweight.
Throat and nose ...	23 (2·1%)	92 (6·6%)	
Eyes, not defective sight	8 (0·7%)	108 (7·9%)	Jews, mostly trachoma.
Ear diseases	35 (3·2%)	100 (7·3%)	
Tubercle, active ...	6 (2·1) 0·5%	155 (19·2) 11·3%	Pulmonary.
,, latent ...	18 1·6%	108 7·9%	Any "closed" form.
Lungs, other diseases	55 (5·0%)	185 (13·5%)	
Syphilis	12 (1·1%)	27 (2·0%)	
Gonorrhœa	7 (0·6%)	28 (2·0%)	
Epilepsy	4 (0·3%)	20 (1·4%)	
V.D.H.	23 (2·1%)	18 (1·3%)	Only disease markedly less for Jews.
Other cardiacs ...	111 (10·1%)	186 (13·6%)	Including "sedentary" heart.
Gastrics and enterites	24 (2·1%)	62 (4·4%)	
Feet, defective ...	134 (12·2%)	338 (24·7%)	Refers to low-grade feet only.
Other diseases ...	143 (13·0%)	359 (26·2%)	
Spinal	33 (3·0%)	36 (2·6%)	See notes following.
Injuries	57 (5·2%)	45 (3·3%)	

Some other diseases were recorded, but the results were nearly the same. Only in V.D.H. is the percentage of cases among the Jews markedly less than among the British; they showed very little true rheumatism, but a marked amount of fibrositis, due to septic, colonic, and gonorrhœal (?) infections, and to hilar tuberculosis.

Out of the 19·2 per cent. cases of tuberculosis 12·5 were rejected, the ordinary closed or latent case, if doing efficient work in a workshop, was posted to similar duties in the army.

Injuries were increased amongst the British by the call up of previously wounded men, and among the Russian Jews by self-inflicted injuries, ulcers, burns (electric), mutilated fingers, &c. The percentage of spinal cases among the Russians is probably small, because such cases would be unlikely to emigrate from Russia.

"Other diseases" do not include varicocele. The dietary of the Russian Jews was deficient in proteins, excessive in starch, probably only the cheaper, vitamine-free, fats were used. They were markedly wanting in "fibrosity"; they tended after 30 to pendulous abdomen when not neurasthenic.

EASTBOURNE WATER-SUPPLY.—The Eastbourne Corporation have decided to buy up the Eastbourne Waterworks Company for the sum of £408,365. The further purchase of West Dean and Friston farms, the natural watershed of the district, by the corporation will ensure an unlimited perpetual supply of the purest water, and these farms to be acquired as soon as possible.

ACTINOMYCOSIS OF THE CÆCUM,

WITH NOTES OF AN UNUSUAL CASE.

BY E. G. SLESINGER, *O.B.E.*, M.S., F.R.C.S.,

ASSISTANT SURGEON, GUY'S HOSPITAL.

ACTINOMYCOSIS, as it affects the various parts of the human body, has been very carefully studied since the original papers of Israel and Ponfick, and a good deal is known about the characteristics of the disease in its three main regional distributions—the face and neck, the lungs, and the alimentary canal. In the latter situation, however, it has become apparent of recent years that actinomycosis is by no means the rare disease that it was formerly thought to be, and the more constantly its possible presence is borne in mind by the surgeon the more frequently will it be recognised in its early stages, with correspondingly better results in its treatment.

Of the recognised cases of actinomycosis approximately 20 per cent. are intestinal, but it would appear, at the least, doubtful whether this represents anything like the real figure. One of the reasons of such a doubt is that many are cases of actinomycotic infection of the appendix, which are satisfactorily dealt with by the usual methods of appendicectomy, the true nature of the case only becoming apparent in the course of routine examination of the removed appendix if such is undertaken. Further, it is unlikely that such cases as that reported in the present paper are of any unusual degree of rarity, and yet I have been unable to find any report of a case of a similar nature in a fairly careful search of the literature of the last ten years.

The Mode of Infection.

In an excellent thesis on the subject in 1897 Hinglais stated that 60 per cent. of abdominal actinomycosis occurred in the appendico-cæcal region, and most writers since that time have given about the same figure. In regard to the method of infection in these abdominal cases there appear to be two main views, which, however, do not differ very greatly from each other. The first is that some infected foreign body, such, for example, as a grain of corn, lodges in the mucosa of the appendix or cæcum, and so carries the infection into the connective tissue planes, where alone it is pathological. A form of membranous surface infection of the mucous membrane has, however, been described, although its pathological significance appears somewhat doubtful. The second view of the mode of infection is that the actinomyces is a frequent normal inhabitant of the intestinal tract, an assumption which is based on the careful work of Dr. Wright, and the rôle of the foreign body is then thought to be merely that of causing the trauma which provides a portal of entry for the organism into the connective tissue planes. Here it spreads by a process of direct extension, for unlike tubercle and blastomyces, actinomyces does not spread by way of the lymphatics or blood stream, a fact which accounts for the extreme rarity of generalised infection in this condition.

Very varying opinions are held as to whether the cæcum or the appendix is the commonest primary site of infection. Kelly, Cope, and others maintain the latter, while Waring, who carefully reported seven cases, holds the former view. The appendicular theory rests mainly on the many cases where actinomyces has been found in appendices removed in the ordinary way, but there is no evidence to show that in many of these cases it represents anything more than the accidental presence of the organism. Cases undoubtedly do occur in which the appendix is definitely primarily affected by the disease, and in these it is noticeable that the base is the part nearly always attacked, in contradistinction to septic infections.

The Three Types of Infection.

Actinomycosis presents itself in the appendico-cæcal region in three different types. In the first and commonest type of case the patient insidiously develops a painless, gradually enlarging tumour in the right iliac

fossa. Such a case, if allowed to progress, ultimately forms abscesses and fistulæ, and more rarely even metastatic deposits in other parts of the body, particularly the liver. This type of case has a grave prognosis, and is responsible for the sinister reputation the disease has in this respect. The second type is more acute and begins with the symptoms of what is apparently an ordinary attack of fairly severe appendicitis. This is operated on, and the appendix, gangrenous usually at the base, is removed, the nature of the infection not being generally recognised at the time. In such a case the resulting sinus is slow in healing, and often during convalescence a secondary abscess forms and bursts through the wound, the nature of the case only becoming apparent at this period. The third type seems to be much less common, and is represented by the case reported in this paper. Here an actinomycotic patch formed in the cæcum and perforated, giving rise to a generalised peritonitis, for which the patient was operated on.

A peculiar feature of all types of abdominal actinomycosis, first pointed out by Liek and well marked in the present case, is the curious "yellow-white" facial appearance of these patients. This colour is very like that so often seen in cases of ectopic gestation, and is quite distinct from the yellow of septic absorption or the dead white of a simple anæmia.

Treatment.

In regard to the treatment of these cases, the most important thing is early recognition of their nature. In many instances this will depend on routine examinations of films and cultures. The surgical treatment consists in opening and scraping sinuses, draining abscesses, or excising or invaginating actinomycotic patches. Hydrogen peroxide is said to be a particularly valuable application. Potassium iodide in large and increasing doses should be administered as soon as the infection is recognised, as much as 100 gr. three times a day being necessary in some cases. When these large doses are being administered, a careful watch must be kept for symptoms of iodism, and the other salts in the diet should be reduced. Wild states that a good method with these large doses is to make a strong solution of the iodide in water and to give each dose in from 6 to 8 ounces of milk. Several observers have reported good results from the use of vaccines.

Case Report.

The following case is unusual on account of the localised nature of the lesion and the onset with generalised peritonitis.

L. W., female, aged 32, was admitted to Guy's Hospital for severe generalised abdominal pain. Two years previously she had had a mild attack of pain in the right iliac fossa, and since then has had abnormally painful periods. The present attack began suddenly the day before admission with severe abdominal pain, worse in the right iliac fossa. Bowels have acted normally.

On admission, temperature 98° F., pulse 105. The patient had a curious "yellow-white" colour and was very ill. Abdomen tender and rigid, especially over the appendix region. Tongue dry and furred. A diagnosis of perforated appendix was made and immediate operation advised and carried out. On opening the abdomen a quantity of purulent fluid welled up from the pelvis and did not appear to be in any way shut off. The cæcum and appendix were brought into the wound. The appendix appeared normal, but on the cæcum, close to the base of the appendix, there was a thickened patch, about the size of a shilling, with a perforation in the middle. On scraping the margins of this patch, yellow granules, suggesting actinomycosis, were seen, and direct films were made from it. The appendix was removed, and the patch in the cæcum scraped and then invaginated. The peritonitis was treated by the method described by Mr. F. J. Steward, several Carrel tubes being passed into the peritoneal cavity and a large exit tube left in the pelvis. A continuous drip of normal saline was maintained through the Carrel tubes for three days, all the tubes being then removed. The patient was put on potassium iodide in doses which were quickly increased up to 50 gr. three times a day. Both the direct films, and further films made from the peritoneal washings, showed the presence of actinomyces. The wound healed rapidly, and the temperature, which showed fluctuations up to 102° for the first 12 days, speedily settled to normal. When seen three months later the abdomen appeared normal, the scar was firm, and the patient in very good general health, the change in her colour being particularly noticeable. She is being kept under observation for some time, owing to the long intervals at which actinomycosis sometimes reasserts its presence.

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A CASE OF

PARATYPHOID "C" FEVER IN EAST AFRICA.

BY R. P. GARROW, M.D. ABERD., D.P.H.

THE extended application of the method of hæmoculture in the diagnosis of P.U.O. during the war has led to important additions to our knowledge of the bacillæmias causing continued fever. Recent interesting contributions[1 2 3 4] to the literature of this subject place beyond doubt the existence of a fourth member of the enteric group of bacilli invading the blood-stream and producing continued fever of the enteric type in man. Although this "new germ of paratyphoid," as Hirschfeld calls it, differs from *Bacillus paratyphosus B* only in its immunity reactions, these differences are sufficiently important to entitle the organism to be named *Bacillus paratyphosus C*.

Earlier workers[5 6] on this subject have reported bacillæmias due to organisms of anomalous character causing enteric-like fever, but whether these bacilli are identical with *B. para. C* can only be decided if cultures have been kept for comparison. It is possible that this same organism has been isolated many times in different parts of the world by different workers and its significance not appreciated. *Bacillus paratyphosus C* has probably not an equal epidemiological importance with the three classical members of the group T, A, and B, as otherwise it would have attracted attention at an earlier date. An organism corresponding in morphological, cultural, and serological characters with Hirschfeld's organism was isolated by hæmoculture from a case of continued fever at Port Amelia, Portuguese East Africa, on Oct. 28th, 1918, in course of routine blood culture for the diagnosis of many puzzling pyrexias met with in that country.

The rule was followed, as far as circumstances would permit, of performing blood culture (5 to 10 c.cm. of blood from a vein sewn in 30 to 40 c.cm. of sterile ox-bile) in every case of fever in which microscopic examination of blood films failed to show parasites, or in which the diagnosis was not otherwise clear. The number of these cases was considerable, and they presented a great variety of temperature charts and clinical manifestations. During 18 months' military service in East Africa in charge of a bacteriological laboratory, I had the opportunity of blood-culturing 313 cases of this kind. Blood culture was advocated as the method which gives the most reliable evidence of active enteric infection, and its application was deliberately extended to the very large proportion of cases where there was little or no clinical evidence that the patient was suffering from enteric fever. In doing this the object was not only to determine the extent to which the enteric group fevers prevailed amongst the troops, but more especially to extend and amplify investigations which the writer had made during two years in the Mediterranean war area into the question of so-called "atypical enteric fever."

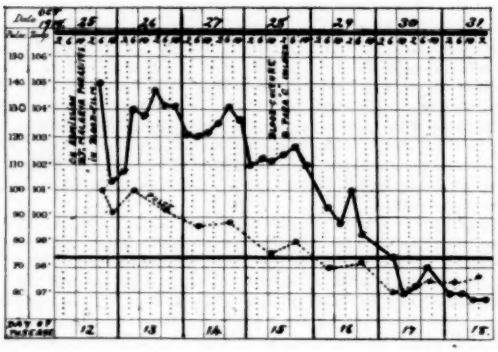
The case of paratyphoid C fever here recorded was the only case of this infection found in the course of these investigations. It was a sporadic case, and in this respect differs from the cases of paratyphoid C fever reported from Macedonia and Mesopotamia,[2 3] in

both of which areas the disease appears to have been more or less prevalent, if not actually epidemic.

History and Clinical Features.

The patient, a South African white, aged 42, who had never been out of Africa, was admitted to the 19th Stationary Hospital at Port Amelia on the twelfth day of his illness with a temperature of 105° F. The routine thick blood film showed benign tertian malaria parasites, and diagnosis was made accordingly. The temperature continued between 102 and 104° in spite of 30 gr. of quinine daily by mouth, and on the fourteenth day of the illness with a temperature of 104°, no parasites were found on second examination of thick films. The medical officer in charge of the case, Captain C. Kelsall, West African Medical Staff, was not satisfied with the diagnosis of malaria alone, and requested a blood culture, which I did on the fifteenth day of the illness. 10 c.cm. of blood was withdrawn into a sterile syringe from a vein at the bend of the elbow, and discharged into 30 c.cm. of sterile ox-bile. The mixture was incubated at 37° C. for 24 hours and plated on Conradi medium. The result was a pure culture of the organism described below.

The patient displayed the five cardinal signs of active enteric infection of moderate severity: (1) Continued fever of remittent type ending by lysis. (See Chart.*) (2) A low pulse-temperature ratio. (See Chart.) (3) Characteristic



toxæmia—dull, heavy, toxin-laden appearance with cheek-flush and heavily coated tongue. (4) A few rose spots on the epigastrium. (5) Palpable splenic enlargement (not of much diagnostic significance in this case on account of a history of many previous attacks of malaria).

The acute illness ended by a rapid lysis, and convalescence was uninterrupted. The attack was not in any way localised to one organ, and there were no lung signs beyond a few moist sounds at both bases.

The Organism Isolated from the Blood.

The organism recovered from the blood of this case on the penultimate day of pyrexia is a short motile Gram-negative cocco-bacillus with the cultural characters of *B. paratyphosus B*, but failing to agglutinate even in low dilutions of any typhoid or paratyphoid serum available for testing. (Lister Institute and Oxford sera, both active when tested with their homologous organisms.) Had the bacillus shown the cultural characters of *B. paratyphosus A*, failure to agglutinate in its homologous serum on first isolation would not have attracted special attention, as such an occurrence has been frequently recorded. But an inagglutinable *B. paratyphosus B* was unknown to me. These characters were confirmed by Major R. Semple, R.A.M.C., in charge of the bacteriological laboratory at Dar-es-Salaam, and by Dr. T. J. Mackie, professor of bacteriology in the University of Cape Town.

On my return to England I gave a culture of this organism to Major F. R. Coppinger, R.A.M.C., who found it to correspond closely with a strain of *B. paratyphosus C* from Macedonia. A subculture was sent for investigation to Dr. J. C. G. Ledingham at the Lister Institute, and a report has been received from Dr. H. Schütze, Lister Institute, stating that

"as a result of agglutination and absorption tests the organism has been found to belong to the group of Salmonella organisms called by Hirschfeld Paratyphoid 'C.' Serologically it more particularly corresponds with the Mesopotamian Paratyphoid 'C' called Baghdad 31."

The organism which on isolation was entirely inagglutinable in para. B serum now shows incomplete agglutination in all dilutions of B serum up to one-fourth titre.

Agglutination Reactions of the Patient.

Table I. gives the results of agglutination observations on the patient's serum. Formalised saline suspensions from agar slopes were incubated with progressive dilutions of serum in tubes in a water-bath at 55° C. for two hours, and read macroscopically, or with the aid of a small lens.

TABLE I.

Day of illness.	T.	A.	B.	C.	Day of illness.	T.	A.	B.	C.
15th ...	20	... 0	... 0	... —	28th ...	20	... 0	... 0	... 80
19th ...	20	... 0	... 0	... 160	45th ...	20	... 0	... 0	... 40

The patient had been inoculated two years previously with two doses of T.A.B. vaccine prepared in South Africa. It was common to find inoculation agglutinins of very low titre or entirely absent in these cases. It will be noticed that tests carried out with the three classical enterica organisms gave a negative result. Tested against his own organism the result was positive.

Table II. gives the results of a series of tests with the serum of a case of paratyphoid B fever in the London Fever Hospital.

TABLE II.

Day of disease.	T.	A.	B.	C.	Day of disease.	T.	A.	B.	C.
9th ...	10	... 0	... 160	... 0	25th ...	10	... 0	... 5120	... 0
13th ...	10	... 0	... 1280	... 0	31st ...	10	... 0	... 2560	... 0
16th ...	10	... 0	... 2560	... 0	33rd ...	10	... 0	... 1280	... 0

This case of paratyphoid B fever, although it developed a high titre of para. B agglutinins, did not show any agglutinins for para. C.

Remarks.

1. This case illustrates the necessity for clinically checking laboratory results. Manson ("Manual of Tropical Diseases") warns the tropical practitioner against the common error of supposing that because a febrile patient has malaria parasites in his blood malaria is the only disease he is suffering from. Malaria frequently co-exists with other acute infections such as enteric fever. Indeed, the subjects of chronic malaria suffering from other acute infections sometimes show a few parasites in the peripheral blood, apparently without these being a factor in the production of pyrexia. In other words, pyrexia accompanied by malarial parasites in the peripheral blood does not necessarily spell acute malarial fever.

2. So far as I am aware, this is the only case of paratyphoid C fever reported from East Africa. Although the organism is more closely allied in its characters with *B. para. B*, it is interesting to note that, in its Eastern distribution, it corresponds more with *B. para. A*.

3. The case also illustrates the importance of hæmoculture as a method of investigation of continued fever. The results of *early* routine hæmoculture are incomparably superior in scientific value to any information that can be obtained by repeated examinations of the serum and excreta.

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* Although the duration of pyrexia indicated on the accompanying chart is 16 days, the earlier part of the illness, of which there was no record except the patient's statement, may have been malaria only.

BOMBAY Corporation has adopted a scheme for the reorganisation of the health department staff in the branches of medicine, sanitation, and conservancy.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION FOR THE STUDY OF DISEASE IN CHILDREN.

EXHIBITION OF CASES AND SPECIMENS.

A MEETING of this section of the Royal Society of Medicine was held on May 28th, Mr. J. P. LOCKHART-MUMMERY, the President, being in the chair.

Dislocation of the Thumb.—Oxycephaly.

Mr. B. WHITCHURCH HOWELL showed a case of Dislocation of the Thumb in an infant. The acute flexion of the terminal phalanx caused it to resemble congenital contraction, a condition with which it might easily have been confused had no history of the accident been available.

Dr. THEODORE THOMPSON showed a case of Oxycephaly in a child 1 year old. The child showed an extreme degree of this deformity, the eyes being very protuberant and the vertex of the skull very high. The occiput was but little developed. An especially interesting feature was that the early age of the infant permitted an increased intracranial pressure to be recognisable readily. The anterior fontanelle was widely open and bulging and the posterior fontanelle was also open. The frontal bones were separate. No other deformity was present, and the intelligence was good.

Congenital Heart Disease.

Mr. D. H. PATERSON showed two specimens of Congenital Heart Disease.

CASE 1 was that of a male baby, aged 10 months, who had been admitted to hospital acutely ill with general pulmonary catarrh, accompanied by high remittent fever. Contrary to the rule, his dyspnœa had been less in the completely supine position than when he was propped up. The pulse was over 160 and often uncountable. There was no definite bruit. Death occurred after three days. Before admission to hospital he had been feverish for a day or two. Blueness had never been noticed, but there had been previous attacks of breathlessness. Post mortem the lungs were congested, but there was no evidence of pneumonia. The heart weighed 2 ounces 14 drachms. Immediately below the aortic cusps there was a hole in the interventricular septum. The aortic, pulmonary, and mitral valves were all large, distorted, and fleshy, but the endothelium was glistening and showed no evidence of inflammation, an observation which was corroborated by microscopical examination. Both the right and left ventricles were hypertrophied, the left more than the right. The ductus arteriosus was closed.

CASE 2 was that of a male infant, aged 8 weeks, admitted to hospital for cough and dyspnœa of one day's duration, accompanied by moist sounds in the lungs. The dyspnœa was urgent, and it was found necessary to support the chest and let the head fall well back to enable the child to breathe. The respirations were sometimes rhythmical. The child was extremely pale. No cardiac murmur was heard. Death occurred next day. Post mortem the lungs were merely congested. The heart was transversely placed within the thorax and weighed 2 ounces 6 drachms. The right auricle was distended and thin-walled, and the left auricle small and rudimentary. Communicating between the two was a patent foramen ovale admitting the tip of the little finger. In the floor of the left auricle lay a completely stenosed mitral orifice. The right auriculo-ventricular valve consisted of two cusps, and the corresponding orifice led into a large thick-walled chamber from which both the aorta and the pulmonary artery proceeded. The valves of these vessels were well formed. Below the origin of the pulmonary artery was a dilated space, the bulbus cordis, which according to Professor Keith, corresponded developmentally to the third ventricle of the fish. The ductus arteriosus was not patent.

A Case for Diagnosis.

Dr. E. A. COCKAYNE showed a case for diagnosis, probably one of Congenital Syphilis.

The boy, aged 9½ years, was undersized and mentally backward. His arms and legs were very long in proportion to his trunk, the distance from the symphysis pubis to the ground being only 1½ in. less than from the symphysis pubis to the vertex. The limbs were very slender and the feet and hands very narrow, but not longer than normal. Radiograms showed marked osteitis of the whole of both femora and very slight osteitis of the tibiæ and fibulæ. Both humeri were thickened and probably the seat of osteitis. There were general muscular weakness, lordosis, and flat-feet. The testicles were very small. There were no other stigmata of congenital syphilis, the Wassermann reaction was negative, and the family history was good.

MONTPELLIER: SOCIÉTÉ DES SCIENCES MÉDICALES ET BIOLOGIQUES.

AT a recent meeting of this society M. DE ROUVILLE and M. J. COHEN reported a case of a large Sessile Anterior Cervical Fibroid developing intra-ligamentary and also between the layers of the pelvic mesocolon. The woman, aged 40, presented as chief symptoms slight menorrhagia with lumbo-abdominal pains. Difficulty was experienced in opening the abdomen on account of adhesions between the peritoneum and anterior surface of the tumour. The uterus contained fibroids and was removed subtotally after enucleation of the tumour from between the two layers of the left broad ligament and the pelvic mesocolon. The bladder was accidentally opened during the operation; the opening was closed and the abdomen closed without drainage. A self-retaining catheter was placed in the bladder. An excellent result followed. The authors remarked especially upon the new connexions contracted by the bladder in the case of anterior cervical fibroids which render it easily wounded at operation.

At another meeting M. SAPPOY and M. TZELEPOGLON described a case of a Double Parovarian Cyst with a long twisted pedicle, the ovary and the tube participating in the torsion. The cyst arose on the left side and ascended nearly to the liver on the right. The pedicle had undergone three complete turns. Its wall presented numerous ecchymoses, but the fluid contents of the cyst were quite clear. Histological examination of the cyst wall showed that the hæmorrhage was limited between two lamellæ of fibrous tissue.

M. GRYNFELTT contributed a paper on the Histology of a Galactocele. The case presented an interesting feature from a clinical point of view—its origin was found to be due to a bite of a horse. Contrary to what is usually found, the author did not find any lesion permitting the placing of the tumour amongst the fibro-adenomas. The wall surrounding the liquid collection was a fibrous membrane of new formation. As in all the cases described, there are inflammatory lesions present without one being able to consider them as chronic abscesses of the breast, for the contents are not those of an abscess. A study of the contents of the galactocele enabled the speaker to establish the following conclusions: (*a*) Numerous granular bodies closely resembling colostrum corpuscles are present in the fluid. (*b*) These granular bodies result from the conversion of white spherules whose cytoplasm becomes charged with fat globules. (*c*) These granular bodies act as true glandular elements and not as scavengers in removing mechanically the contents of the collection. (*d*) It is this process which explains the cases of spontaneous cure of this affection, but it is not the only factor, for the wall of the galactocele proliferates into the interior of the milky mass and tends to obliterate the cavity.

MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND.—The ordinary quarterly meeting of this association was held on May 20th at the rooms of the Royal Society of Medicine under the presidency of Dr. Bedford Pierce, when the first Maudsley lecture, under the bequest of the late Dr. Henry Maudsley, was delivered by Sir James Crichton-Browne, who in a comprehensive essay dwelt on the modern combination of laboratory and clinical work and the necessity of founding mental hospitals. He concluded with references to shell shock and general war neuroses. The address was much appreciated by those present, and a vote of thanks to the lecturer proposed by the President and seconded by Sir George Savage was carried with enthusiasm. The sequel to the address will be published in two parts, the first part appearing in our present issue (p. 1248).

SOCIETY OF MEDICAL OFFICERS OF HEALTH: FORMATION OF A TUBERCULOSIS GROUP.—A meeting was held at 1, Upper Montague-street, London, W.C., on May 28th for the purpose of forming a Tuberculosis Group within the society. All tuberculosis officers and others interested in the Group were asked to attend. Dr. F. N. Kay Menzies presided, and, after welcoming those present, spoke in favour of the proposal before the meeting. After some discussion, in which Drs. Halliday Sutherland, G. Jessel, Hyslop Thomson, and H. A. Ellis took part, Dr. Thomson moved that the Group be formed and that Dr. F. G. Caley be made secretary. Dr. A. Ashkenny seconded and the resolution was carried. A committee, consisting of Drs. Ellis, Caley, J. Sorley, F. Stanley Tinker, and M. Macdonald, was appointed to draw up rules, and it is suggested that the first meeting of the Group should be held in July.

Reviews and Notices of Books.

1. LA FATIGUE DE L'APPAREIL VISUEL CHEZ LES OUVRIERS MINEURS.
   Par le Dr. M. STASSEN. Liége: H. Villant-Carmaune. 1914–1919. Pp. 234.

2. MINERS' NYSTAGMUS.
   By FREDERICK L. HOFFMAN. Washington: Government Printing Office. 1916.

1. Dr. M. Stassen's book will rank with that of Dr. Lister Llewellyn (published in 1912), among the chief authorities on miners' nystagmus. As to the main cause of the disease, the two are in entire agreement, and, indeed, the evidence is overwhelming that the defective lighting of coal-mines is, in the main responsible. Dr. Stassen puts it in this way: the overwork imposed on the visual apparatus of the coal-miner, obliged to work continuously in partial darkness, produces a nervous syndrome characterised by incoördination and exaggeration of the visual reflexes. The clinical symptoms of this syndrome may vary, but they are all the results of accumulated fatigue. Hemeralopia, retinal asthenopia, insufficiency of convergence, blepharospasm, and other symptoms which may precede or accompany nystagmus are all alike due to visual fatigue from work in defective light.

After an historical chapter, in which the literature since 1861 is briefly summarised (and in which, by the way, the names of English authorities are sadly mauled about), and another in which the physiological conditions to which the coal-miner is subjected are described, various statistics and clinical observations are detailed, all tending to the same conclusion as to the causation of the disease. There are, no doubt, other contributory factors in many cases, and it stands to reason that since only a minority of the miners who work under similar conditions are attacked, the nervous constitution of the patient is a matter of primary importance. That the nystagmus of miners, however, has very little in common with the labyrinthine variety is suggested by an interesting chapter, in which it is shown how the oscillations of the eyeball which occur in the two forms of the disease may be analysed by means of the nystagmograph of Buys. In miners' nystagmus an oscillation of the eyeball occurs in which the movements to and fro are symmetrically timed, whereas in the case of labyrinthine nystagmus the movements comprise a series of jerks consisting of a rapid movement in one direction and a slow recovery. It is possible for the two diseases to coincide in one patient, but in that case the result is not a combination of the two types of movement, but the appearance of now one and now the other type of nystagmus, according to the conditions of the moment.

It is when we come to a description of the practical measures to be taken for improving the lighting of the coal-mines that we find the information contained in this book insufficient. Electric lamps had only been introduced in a few Belgian mines shortly before the war, and although these are recommended by the author he points out the disadvantage they have compared with the safety-lamp in failing to warn the miner of the presence of fire-damp; it has even been found necessary in certain dangerous mines to provide the miner with an oil safety-lamp in addition, thus adding both to the weight and the expense. Further, to avoid dazzle the author recommends that the electric lamp should be partially frosted.

2. The American Bureau of Mines has printed this pamphlet with the avowed object of disseminating information. It is a compilation from various sources, chiefly English, but also Belgian and German, and it is disappointing to find that there are practically no American investigations on the subject. There is only one report derived from an American source, compiled in January, 1911, by the Illinois Commission on Occupational Diseases. In this the rarity of miners' nystagmus is remarked. Out of 500 pick-men examined not a single case was found. The report inclines to the older view that the disease is caused by a constrained position of the body with the eyes directed upwards, a view of the disease which the more recent investigators in this country are unanimous in rejecting.

CUNNINGHAM'S MANUAL OF PRACTICAL ANATOMY.
Vols. I. (Limbs) and II. (Thorax and Abdomen). Seventh edition, revised by ARTHUR ROBINSON. London: Henry Frowde and Hodder and Stoughton. 1920. Pp. 451 and 524. 12*s.* 6*d.* per vol.

THE addition of extra matter and a considerable number of new illustrations makes it necessary that "small Cunningham" should appear in three volumes in this edition, and these are the first two numbers of the new issue. The work, of course, has long passed the era of criticism, and is firmly established at the head of all dissecting manuals. These volumes have been revised in many ways; the directions for dissecting are more prominent, a good deal of editing of the text has been undertaken, and many new figures of dissections and sections have been introduced, with a large number of radiographs. All concerned with the production have reason to be proud of the two beautiful volumes so far issued in the edition. We notice one or two minor misprints in the second volume: thus, in Fig. 82, the urethra is termed ureter, the round ligament of the liver seems to run a curious course with reference to the inferior mesenteric vein in Fig. 162, and in Fig. 205 the lower label of the levator ani appears to indicate the internal sphincter. The Basle nomenclature is used throughout, with occasional references to the English terminology.

SANITATION FOR PUBLIC HEALTH NURSES.
By HIBBERT WINSLOW HILL, M.D., D.P.H., Professor of Public Health, Western University. London and New York: Macmillan Company. 1919. Pp. 209. 7*s.*

"THIS book was written to give public health nurses a concise view of the fundamentals of modern public health as it is to-day," but after this sentence in the preface the nurses in question appear not to have bulked more largely in the mental audience of the author than others of the public who are interested in preventive medicine. The work is an essay on practical epidemiology, with a popular description of those infectious diseases which are most common in America, with chapters on food, flies, cleanliness, ventilation, and vital statistics. It is modern in its contents and original in some of its methods of teaching.

Many parts of the book will appeal more to that section of the medical profession which is interested in the ætiology and prevention of infectious diseases than to nurses and health visitors, as we call "public health nurses." The latter can hardly be expected to be "up" in the subjects of paratyphoid fever and anaphylaxis, nor in "Duke's disease" which Dr. Hill disposes of by classifying rötheln into "scarlatinoid German measles" and "measly German measles." A much more severe type of scarlet fever is described than that which is now common in this country. The views expressed are, on the whole, sound, and there are several interesting observations noted—e.g., that the aural discharge of measles does not appear to be infectious.

The chapter on cleanliness may be specially commended to those who aim at the chastening of health faddists. Its aim is largely to show that infectious disease cannot be avoided by cleanliness, in the general sense of the word, but only by such scientific and coördinated measures as prevent the inroad of the special forms of foreign matter which convey the materies morbi of these diseases. This chapter may be commended to all nurses, while those nurses and health visitors who have been sufficiently educated to appreciate the terms used will find the whole book worth reading. The chapter on vital statistics contains specimens of propaganda child-welfare leaflets, which should be found useful in schools for mothers. Each chapter concludes with a summary—a practice which might with advantage be more generally adopted.

TAYLOR'S PRINCIPLES AND PRACTICE OF MEDICAL JURISPRUDENCE.

Seventh edition. Edited, revised, and brought up to date by FRED. J. SMITH, M.A., M.D. Oxon., F.R.C.P., F.R.C.S., Physician to, and Lecturer on Medical Jurisprudence at, the London Hospital. London: J. and A. Churchill. 1920. Vol. I., pp. 940; Vol. II., pp. 952. £3 3s.

THE nature and scope of this work are too well known to require any introduction to our readers. In his time the late Dr. Alfred Swaine Taylor was undoubtedly the leading English medical jurist and toxicologist, and several editions of his treatise appeared rapidly. The fifth and sixth issues were ably edited by the late Dr. F. J. Smith, as well as the seventh, whose two volumes form an excellent and exhaustive account of medical jurisprudence. They will be found especially useful for reference; the very large number of illustrative cases and legal decisions which they contain render the work valuable both to barristers and medical men in dealing with medico-legal problems. Many changes are to be found in the present edition, and in the preface the editor acknowledges the unstinted assistance given him by Dr. W. Bulloch, to whom are due the references which will be found at the end of nearly every section of the work. These are especially numerous in the section of toxicology, where new information on various poisonous substances has been added and numerous rare cases of tragedy and crime have been recorded. The section on lunacy has been entirely recast and brought up to date. The Mental Deficiency Act has received notice, as have also the resolutions of the Pharmaceutical Society on the Poison Schedule.

During recent years the Workmen's Compensation Act has added greatly to the work of the Law Courts, and it is most advisable that medical practitioners should make themselves acquainted with the subject. The problems are well set out which may present themselves when claims are made under the Act, and many cases and decisions are given which will serve as guides in the consideration of any particular case. The question "What is an accident?" has now assumed complexities and proportions totally unthought of years ago, and the wording of some of the clauses of the Act is confusing. The observations on this subject are well worth perusal. Dr. Smith's large experience as a medical referee to the Home Office gave him opportunities of seeing the practical working of the Act, and the cases recorded well exemplify the difficult and complicated positions which present themselves. The relation of antecedent disease to "accident" is dealt with at length; this matter is intimately connected with medical evidence and often gives rise to differences of opinion. We entirely agree with the dictum that in all fatal cases an autopsy should be held; the medical witnesses may then explain the bearing of these facts on the fatal event and leave to the law the decision as to the adjustment of compensation. The arrangement of the index calls for special approval. The illustrative cases are classified under headings, so that when dealing, say, with a case of gunshot wound similar cases can at once be consulted. This makes for great saving of time and removes risks of error.

We can once more speak in the highest terms of Taylor's Jurisprudence, both as a work of reference and as a book to be studied for the higher examinations.

A MEDICAL HANDBOOK.

For the Use of Practitioners and Students. Fifth edition. By R. S. AITCHISON, M.D., F.R.C.P. Edin., late Medical Officer, Out-patients' Department, Royal Infirmary, Edinburgh. London: Charles Griffin and Co. 1920. Pp. 390. 10s. 6d.

THIS little handbook, which has now reached a fifth edition, provides an excellent clinical summary of medical disorders. The book is intended to form a vade-mecum which the busy practitioner can read through rapidly. The classification of diseases is entirely clinical, this arrangement having been adopted with a view to increasing the value of the book in the practical diagnosis of disease. The author's personal experience finds more ample expression than is commonly the rule, while the references are not confined to recent advances in medical knowledge, but preserve much that is reminiscent of former wisdom. "General Data Useful for Reference" are collected together towards the end of the book, and the subjects dealt with cover a wide field. Here will be found a classification of skin diseases, rules for the management of infants, incubation periods, notes on certifying the insane, a classification of poisons according to the treatment required, signs of approaching death, &c. Post-mortem examination and prescribing are the subjects of yet other chapters, and an appendix deals with such subjects as test meals and Widal's reaction. Well-established drugs rather than the newer remedies find a place in the sections devoted to treatment, and a useful collection of prescriptions in general use has been appended. This thoroughly useful book is illustrated by upwards of 40 figures.

THE SEXUAL DISABILITIES OF MAN.

Their Treatment and Prevention. Fourth edition. By ARTHUR COOPER, M.R.C.S., L.R.C.P. London: H. K. Lewis and Co. 1920. Pp. 266. 7s. 6d.

THE value of this book, a useful treatise in its earlier form, has been enhanced by the addition of two new chapters, carefully and moderately written, on hygiene and continence. The first of these chapters is summarised in the author's rule that "no two persons of any age or sex should sleep together in the same bed." The application of this rule to husband and wife in particular is justified by a wise and detailed discussion of marital needs. It is to be regretted that in the chapter on continence the importance of early marriage is not definitely insisted on, for this is the practical lesson which shapes itself insistently in our mind after reading Mr. Cooper's argument. In youth continence is both possible and desirable, from the psychological as well as from the physiological point of view; for, as Montaigne puts it: "Il n'y a n'y continence n'y vertu, s'il n'y a de l'effort au contraire." But, as Mr. Cooper frankly says, the sexual appetite is natural, and while it may be advantageously controlled it cannot be permanently repressed without damage to the normal individual. For this reason as well as for many others—the control of venereal disease among them—a State subsidy in aid of early marriage might be a blessing to society.

A postscript is added on the relation of warfare to sexuality. It consists of quotations from various authors. Two conclusions appear. In the first place that the dominant appeal to the instinct of self-preservation relegates the sex instinct to a place of secondary importance under combatant conditions. Secondly, that the unnatural grouping of healthy males in large bodies isolated from the rest of the community tends to sexual perversion. These facts are now fairly well recognised, and scarcely needed further emphasis.

FACIAL NEURALGIA AND ITS TREATMENT.

With Especial Reference to the Surgery of the Fifth Nerve and the Gasserian Ganglion. By J. HUTCHINSON, F.R.C.S., Surgeon to the London Hospital. London: John Bale, Sons, and Danielsson. 1919. 37 figures. Pp. 216. 15s. net.

THIS monograph is an enlarged revision of the essay which received the Jacksonian prize at the Royal College of Surgeons of England in 1915. The book opens with an account, well illustrated with drawings from dissections, of the surgical anatomy of the fifth nerve. The causes and different forms of facial neuralgia are then passed in review, and the minor neuralgias are clearly distinguished from the epileptiform variety, the term the author uses to denote tic douloureux. The greater part of the book is devoted to a consideration of the symptoms, course, pathology, and treatment of the epileptiform type. Before advising excision of the Gasserian ganglion the surgeon is warned that he must ascertain that his patient is the subject of true epileptiform

neuralgia and of nothing, else, if the result is not to prove disappointing. Above all must he exclude cases simulating tic douloureux in hysterical or neurasthenic subjects. By the modified operation which Mr. Hutchinson advocates—that is, by sparing that part of the ganglion concerned with the first division of the fifth nerve—all fear of subsequent damage to the patient's eye can be avoided. The temporal route of approach is the one recommended, and as the whole of the skin flap is made within the area of the scalp the scar is subsequently concealed by growth of the hair. It is a surprising fact that patients suffering from tic douloureux will endure its tortures for five or ten years rather than seek relief by an operation, which in competent hands, performed by the method set out in this monograph, is mostly free from risk to life or eyesight.

A critical account of the treatment by alcohol injections is given, and a method adopted by the writer of approaching the superior maxillary division of the nerve through the orbit is described. The conclusion arrived at is that sooner or later with treatment by alcohol injections recurrence of the neuralgia occurs. A short account is given of neurectomy of the second and third divisions of the nerve. Resection of the superior maxillary division has an advantage over removal of the Gasserian ganglion in that the motor fibres are not involved, hence the masticatory muscles retain their power and there is an entire absence of deformity of any kind; but as a curative operation neurectomy is inferior and recurrence of pain sometimes compels a resort at a later date to removal of the ganglion. An extensive bibliography brings an excellent monograph to a close.

THE TOPOGRAPHICAL ANATOMY OF THE LIMBS OF THE HORSE.

By O. CHARNOCK BRADLEY, M.D., D.Sc., M.R.C.V.S. Edinburgh: W. Green and Son. 1920. Pp. 172. 21*s.* net.

THIS is a manual for veterinary students who are dissecting the horse's limbs, and is a clear and carefully written guide for their researches. Perhaps in future editions a little more stress might be laid with advantage on the relations of the structures described, and references in the text to the figures, when appropriate, would be of some value to the learner. These figures are an outstanding feature of the book, and one would like to see full use made of them. The author does not confine himself to bare description, but every now and then goes shortly into morphological points and thereby enhances considerably the interest of his subject. The derivation of anatomical terms is treated in footnotes by Dr. E. B. Jamieson. This is a custom which has fallen into disuse in works on human anatomy, but is one that might be revived with advantage in these days of non-classical education in order that students may learn, in Principal Bradley's words, that "terms are more than mere collections of letters." The author uses the Basle nomenclature, but apparently could not bring himself to the point of using the names which that terminology inflicts on the carpal bones.

A JUNIOR COURSE OF PRACTICAL ZOOLOGY.

Ninth edition. By the late A. MILNES MARSHALL and the late C. HERBERT HURST. Revised by F. W. GAMBLE, D.Sc., F.R.S. London: John Murray. 1920. Pp. 517. 12*s.*

Milnes Marshall had a wonderful vivacity, which is shown in the practical book still bearing his name. The eighth edition appeared quite recently, and sufficient time has not elapsed since its publication for Professor Gamble to find many changes necessary. A new account of the tapeworm has been added, based upon a description of *Dipylidium caninum*, the tapeworm most commonly found in the dog. There has also been some revision in the nomenclature of the vertebrate kidney. It is a pleasure to notice that instead of increasing the price of the book the publishers have actually been able to reduce it.

PRACTICAL HISTOLOGY.

Third edition. By J. N. LANGLEY, Sc.D., LL.D., F.R.S., Professor of Physiology in the University of Cambridge. Cambridge: W. Heffer and Sons, Ltd. 1920. Pp. 320. 10*s.* 6*d.*

As physiology is concerned with the functions of an organ in its aspect as the sum of the functions of its microscopical constituents, the author thinks the custom in British universities for histology to form part of the course of instruction in physiology is indubitably the best, at least so far as the teaching of elementary students is concerned. The present work was already so good, the outcome of extensive experience in the Cambridge School, that the reader would hardly expect many changes. Still, a number of changes have been made, including recent improvements in methods and alterations in nomenclature. The author is of opinion that whilst some knowledge of method is necessary, it is more important for an elementary student to be able to understand what is shown by the specimens than to be able to make them. There is a fair amount of small type giving notes for advanced students. The directions are clear, precise, and definite, and deal partly with the art of making the preparations, partly with descriptions of the objects to be recognised and identified in each section. As to section-cutting, the only instrument figured is the rocking microtome of the Cambridge School. As in previous editions, there are no illustrations of the sections in the text, which is descriptive only, the student being thereby encouraged to make a drawing of what he sees. The book is an admirable compendium, compressed into 36 lessons, of what a medical student ought to know of histology, and if he makes good use of the "demonstrations" his knowledge will be greatly enlarged and extended.

JOURNALS.

The Journal of Industrial Welfare. Price 6*d.* monthly. Published by the Industrial Welfare Society, Sanctuary House, Tothill-street, S.W.—Industry, by grouping together larger or smaller numbers of the community in the common interest of production, provides social machinery which may be used in a variety of ways. In our own columns we have from time to time dwelt upon the way in which industrial organisation is of value for developing the science of industrial hygiene, and also on the importance to this science of social knowledge. There are two sides to the work, a medical side and a social side, complementary and necessary the one to the other. Among contemporary publications *The Journal of Industrial Hygiene* may lay claim to represent the medical side, and we note its editors do not neglect the social aspect. We have been watching with interest the appearance of another periodical, the *Journal of Industrial Welfare*, which should claim to represent the social side; it is well printed and well illustrated. But we must confess to a feeling of disappointment with its contents; accounts of sports, of the performances of theatrical troupes, pictures of canteens and of gymnasiums, a little safety-first and hints at first-aid, made useful propaganda a few years ago. To-day industry wants something more definite, and so does the medical profession; the supporters of this industrial journal are for the most part large employers of labour, and might be expected to issue information based upon scientific data rather than sketchy allusions to welfare schemes. Masters and men are to-day hard-headed folk; they like to have facts plainly set forth. What do welfare and health schemes cost? What benefits result to those concerned? When a well-intentioned employer starts a scheme the workers ask, "Where is the snag?" If the men propose it the employers ask, "Where do we come in?" We hope that this new journal, by anticipating such obvious questions, will yet see its way to taking up the position it should. We all need real information by industrial economists, setting forth the economic value of welfare in reducing labour turnover, in lessening lost time, in settling personal grievances, in increasing efficiency, and in promoting good fellowship. These things may happen, but it is for those who claim their truth to state the evidence, and to show as clearly as it can be shown that industrial welfare is mutually beneficial, that here neither capital nor labour can benefit at the expense of the other, and that neither can benefit without the other also benefiting.

THE late Mr. H. G. Turner, of Staplegrove, Taunton, has bequeathed £1000 to the Taunton and Somerset Hospital.

THE LANCET.

LONDON: SATURDAY, JUNE 5, 1920.

The Outlook in Medicine and Dentistry.

IN his Presidential Address at the opening of the summer session of the General Council of Medical Education and Registration, Sir DONALD MACALISTER made the customary survey of the changes that had taken place since the last session and indicated the problems arising for present consideration. There will be but little penal business to be dealt with, and though important educational matters will be discussed the President saw no reason to anticipate a long session. In chronicling the transference to the Ministry of Health of the duties hitherto performed by the Secretary of State with regard to the Anatomy Acts, Sir DONALD MACALISTER expressed the hope that the new arrangement would lead to "much-needed improvements in the provision made for the practical teaching of anatomy and surgery." Most of the 3420 new students placed on the Register in 1919 will find their way to the dissecting-room this autumn, and their extraordinary number—more than double that of 1914, and exceeding by 1000 the previous record annual entry—makes the provision of adequate material a most urgent problem. Students cannot acquire a satisfactory knowledge of anatomy in the proportion of 20 or 30 to one subject. The relative ease—depending mainly on the persuasiveness of the resident medical officers of the various institutions—with which pathological human organs can be obtained for purposes of investigation and demonstration must cause envy among those whose essential teaching material consists of normal skeletal, muscular, and nervous tissues in situ. Not the most skilful special pleading convinces the general public—in whom the demands of the anatomists still arouse horror, even though biological knowledge is becoming more general—that the practice of dissection is likely to lead directly to the relief of human suffering. It becomes, therefore, the business of an enlightened department of the State to see that the needs of the anatomical school are met in a sympathetic spirit.

The position as regards qualified recruits to the profession is not so unsatisfactory as might have been feared, since the Medical Register in 1919 was enriched by the names of 450 practitioners on the Colonial and Foreign lists. The proportion of women to men is still on the increase, and Sir DONALD MACALISTER had a word of warning for those who are too optimistic about the professional chances of recently qualified women in the immediate future. However, there still appears to be a need for students of both sexes in the sister profession—hitherto something of a step-sister in popularity—of dentistry. The addition of only 128 dentists, as against 1322 doctors, to the Register in 1919 seems disproportionately small, especially since the dentist is acquiring more and more importance as a valuable ally in the cause of preventive medicine. It is true that the ratio, roughly 2 to 1, of the entry of medical students in the two years 1919 and 1914 is almost exactly reflected in the Dental Students Register, but the extension of conservative dentistry to the masses is leading to a relative increase in the demand for dentists and following the promised Bills dealing with dental registration and the general improvement of dental services, the numbers of doctors and dentists should tend to approximate. Even if they devoted their whole time to school work the existing dentists could not cope with the needs of the 5,750,000 school children while neglecting the rest of the population. And unfortunately evidence seems to be accumulating that the British need for good dentistry, preventive and curative, has been allowed by popular ignorance and slackness to become a national reproach.

Intending students of medicine and dentistry, and those interested in their careers, would do well to study the figures given by the President of the General Medical Council. He calls attention to the overcrowding in the medical schools and suggests that the authorities concerned would welcome a reduction in the entry until the capacity of the profession to absorb so many new recruits is established. The considered words of Sir DONALD MACALISTER should carry weight, for no one who has followed his presidential addresses to the Council can fail to have been impressed by the accuracy of his forecasts and the care which he has shown in guiding the deliberations of the body whose duty it is to maintain our profession at a high standard to meet the public need.

A Quantitative Test in Pulmonary Tuberculosis.

THE value of the investigations carried out by Professor G. DREYER and Dr. L. S. T. BURRELL, whose paper we publish in this issue, is greater than a casual perusal might suggest. Not only do they describe a quantitative test of the severity and extent of pulmonary tuberculosis and of its reaction to treatment, but they also set up an anthropometric standard by which, it may be hoped, the potentially tuberculous, and not merely the tuberculous, can be judged. Most of their investigations concern definitely tuberculous or healthy persons. To distinguish between these two classes is easy enough without the aid of elaborate tests. But there is a large intermediate class consisting of the ante-tuberculous, whose lowered vitality is the expression of heredity and of that ill-defined condition labelled diathesis, and the tuberculous, whose disease is still clinically latent. To what extent can this anthropometric standard help us at once to pick out the candidate for consumption ten years or more hence? The plan, originated by the Framingham Community Health and Tuberculosis Demonstration in the U.S.A., of making wholesale health surveys, promises to be adopted in many other parts of the world, and the time may not be far off when respectable citizens will enjoy the benefits of

analyses and examinations which have hitherto been inflicted almost exclusively on criminals. When that time comes, what will be the tests by which the prospective consumptive will be singled out? v. PIRQUET'S and the other tuberculin tests leave much to be desired; they have served a useful purpose in referring the problem of tuberculosis back to infection in early childhood, but they are of little diagnostic and prognostic help in the period—often measured by decades—between infection and the outbreak of tuberculosis. Is the anthropometric standard sufficiently free from sources of error to distinguish not only between classes A, B, and C, but also between class A, and what we would call class A (2)? Professor DREYER and Dr. BURRELL do not at present claim to have evolved a test of critical and decisive value in ante-tuberculous cases, but in establishing the importance of their test in relation to well-defined disease they are building a solid foundation on which more ambitious structures may be reared.

A line of research which might yield instructive data would be a comparison of the vital capacity constants in the first- and the later-born. Can the comparatively great susceptibility of the first-born to pulmonary tuberculosis, as proved by KARL PEARSON and SÖREN HANSEN, be correlated with a vital capacity below normal? KJERRULF has lately shown that in school children there is no essential difference in the chest measurements of the first- and the later-born; but he has not applied the tests described by Professor DREYER and Dr. BURRELL. It would also be of interest to compare the vital capacity with the blood pressure and the oxygen metabolism in various stages of pulmonary tuberculosis. MARIE KROGH'S recent researches into the oxygen metabolism of the body at rest in various diseases have provided numerical data of great value, and the extension of her methods of research to cases of pulmonary tuberculosis might well yield results which, in conjunction with vital capacity measurements, should add appreciably to our knowledge of pulmonary tuberculosis.

The Banner of Research.

THE growth of public recognition of the benefits derived from research, and the decreased power of the antivivisector to belittle them, are largely due to the propaganda of the Research Defence Society. Since its inception in 1908 this society has striven to educate the ignorant, appease the fanatic, and convince the reasonable man. In its quarterly reports it not only makes plain the latest attempts (sometimes well concealed) to obstruct research, but calls attention to new work and current literature. In the last report a quotation is given from an address delivered by Sir WALTER FLETCHER on March 9th to 40 Members of Parliament, and the address itself has more recently been published by the society in pamphlet form. Sir WALTER FLETCHER claimed that the application of medical science had been one of the fundamental essentials of our victory in the great war. He was right. As examples of the actual economy in pensionable morbidity effected by research he quoted the regulations against bathing in infected waters in Egypt, the surgical application of the pathology of gas gangrene, and the tests to determine the prognosis of trench nephritis. Finally, he spoke of the necessity of enabling men of the first ability to adopt research as a career by securing to them a living wage. "They do not ask for wealth, but they want reasonable freedom from care." One common fallacy mentioned in the address may be emphasised. The idea that a man can spend his novitiate in clinical practice and, having earned distinction and a competence, can then usefully turn to the investigation of the problems he has encountered, is unsound. But there is a more hopeful avenue open. Too often in the past a graduate who had qualified for a series of research scholarships found himself at 35 without an assured income or status, whereas his less brilliant contemporary had risen through conscientious routine work to a position on the scientific teaching staff of his medical school. The tendency in recent years to select for University chairs men with a good record of research, irrespective of their previous teaching experience, must be taken as an indication of brighter possibilities for the research scholar. Definite evidence that experience and skill as a teacher is as desirable an attribute in a candidate for a high teaching post as indication of capacity for research, is another question, and a personal one in each instance. The teacher whose horizon is bounded by his annual course of lectures may become pompous and dogmatic with the years; on the other hand, we all have experience of the distinguished scientist who cannot inspire or even control his class. Perchance the policy of the Medical Research Council in distributing research grants to the junior men at the medical schools will help to develop the ideal type of combined investigator and pedagogue.

Insects and Disease.

A CONGRESS is being held this week in London of our leading economical entomologists, and the programme reveals, what has long been familiar to the medical profession, that a comprehension of the life-history of insects supplies civilisation to-day with an enormous amount of information in respect to agriculture and the production of foodstuffs, while furnishing indications also of how some of our principal epidemics are spread, and how they may be avoided. It is only of recent years that there has been any close attention paid to the rôle of insects in the transmission of disease, though students of medical literature know well that in many directions the exact knowledge of to-day was the subject of forecast by the epidemiologists at the beginning of last century, who refused to acquiesce in the theory which attributed plagues and pestilences of all sorts to "miasma." But technical research had not arrived at a point when they could justify their incredulity by substituting a true ætiology, and they remained prophets of, and not participators in, the new truths. The discoveries as to the transmission by insects of protozoal parasites is one of the glories of last century's medicine, and the establishment of the fact that bacterial disease could be conveyed in a similar manner by insects has proved of equal importance. These things were recognised by the Colonial Office when the Imperial Bureau of Entomology was founded, and the activity displayed by this bureau in the identification of insects, and in the support of expeditions to the actual sites of insect-spread disease, has been of the greatest practical value to medical research. But we need not for a medical audience expatiate upon the supreme importance in modern pathology of the study of the life-history of insects.

Annotations.

"Ne quid nimis."

INTERNATIONAL HONOUR TO SIR CLIFFORD ALLBUTT.

THE Association of American Physicians is for the first time electing to its body honorary members who live outside the United States, and Sir Clifford Allbutt is the first physician from another country to be elected in this way. It is true that Sir William Osler was a member of the Association while he was holding his professorial post at Oxford, but although he was in a sense an honorary member he was also one of the founders. Following Sir Clifford Allbutt's name the names of Professors Roux, of Paris, Heger, of Brussels, and Marchiafava, of Rome, were presented. The whole of the British medical profession will endorse the honour thus paid to Sir Clifford Allbutt's eminent services in the cause of scientific medicine. It is certain that to be brought thus, and once again, into relation with Osler will have for him real if pathetic pleasure.

NUTRITIONAL NEEDS AND THE PATHOGENESIS OF DEFICIENCY DISEASE.

BEFORE the war it was generally held that Voit's standard of 3000 calories, including 118 g. of protein, constituted the optimum food intake for the 24 hours. Most nations of the world lived below this level during the years 1917–18, some of them much below, and Central and Eastern Europe cannot approach this standard at the present time. It might be thought that the experience thus obtained would have been sufficient to confirm or disprove Voit's deductions, but this is to ignore the significance of a rather warm discussion which has been going on between Rubner and Hindhede in the German medical press.

Hindhede has, of course, long stood with Chittenden for the non-necessity of a high protein intake, and along with certain enthusiastic disciples had the courage himself to subsist for many months on a diet of bread and margarine, maintaining, it is alleged, full working efficiency. The most recent support to this thesis comes from the Hygienic Institute in Leipzig (*M.m.W.*, April 16th), where Professor Kruse and Dr. Hintze, on the results of a long series of exact experiments, inclined to the Chittenden view and put the necessary protein intake at three-quarters only of the Voit standard. It is, they say, a matter of fundamental importance for the future of the German people to live within the compass of its domestic food production; and they agree in effect with Bayliss's maxim to take care of the calories and the protein will take care of itself. But in the same number of the Munich journal Dr. Otto Kestner reviews Benedict's latest study in the Carnegie Institute, in which any reduction on the Voit standard is held to put a limit on the physical and mental capacity of the strong and healthy man. Kestner recalls that it is only within the last two generations that the world has become sufficiently rich to obtain for each individual the food-supply necessary to the full development of healthy faculties, and he regards the agitation of Hindhede, Berg, and others, as nothing less than a public danger. Something similar has occurred in Belgium, where the nominal allotment of food during the war was 2800 calories or so; but of this total Dr. J. Demoor and Dr. A. Slosse contend (*Acad. Roy. de Méd. de Belgique*, April 25th) that only 1400–1500 calories actually reached the consumer. These authors sharply controvert Starling's assumption that hyponutrition was rare in war-time Belgium, asserting rather that tuberculosis and debility played great havoc with the population, while the average Belgian male lost weight to the extent of 10 kilos. Three recent numbers of the principal Austrian medical paper have been largely occupied by a verbatim report of the address on Austria's food problem given by Professor A. Durig before the Vienna Medical Society. Of this address our Vienna correspondent gave an able summary in THE LANCET of May 15th (p. 1084). Durig concludes that Voit's standard must be maintained, in the face of almost blank despair as to how it can be done. In his concluding paragraph he points to the example of a small and isolated country without seaboard which has solved with success its own nutritional problem. What Switzerland has done and can do must be Austria's diligent aim in the coming months and years.

To keep up Voit's standard is at present a question of world-production and world-distribution, with which medicine is only indirectly concerned. But evidence is accumulating rapidly in regard to alleviatory measures, especially in Vienna, where Dr. Harriette Chick and Dr. Elsie Dalyell, representing the Committee on Accessory Food Factors, are carrying on important investigations with the whole-hearted assistance of the Austrian medical profession. A chapter dealing with this work appears in the report of the Lister Institute for 1920, just issued. Rickets, which has of late been developing in an alarming manner even in breast-fed infants in Vienna, is being staved off by allotting to nursing mothers a daily ration of butter, 50 g., and raw swede juice, 30 g. Osteomalacia, which became common last year in both sexes and at all ages and decimated especially the convents, has been shown to be probably due to deficiency of the fat-soluble accessory substance. Scurvy is yielding to extra antiscorbutics in the form of swede juice, orange juice, and neutralised lemon juice. These are only palliatives, but palliatives which are saving many lives and helping to tide over by medical means an emergency which can only be dealt with in its entirety by enlightened statesmanship.

In this connexion it is interesting to refer to the valuable series of researches into the pathogenesis of deficiency disease, continued by Lieutenant-Colonel R. McCarrison, at the Pasteur Institute of Southern India, Coonoor, further contributions on the same subject being reported in the *Indian Journal of Medical Research* (Vol. VII., No. 2). In THE LANCET of July 12th, 1919, and Feb. 14th, 1920, we commented generally on Colonel McCarrison's previous researches.

The reports now published, five in number, deal respectively with the histopathology of deficiency diseases, the influence of a scorbutic diet on the bladder, the effects of autoclaved rice dietaries on the gastro-intestinal tract of monkeys, the general effects of deficient dietaries on monkeys, and the occurrence of recently developed cancer of the stomach in a monkey fed on food deficient in vitamines. With regard to the results of his experiments on the general effects of deficient dietaries on monkeys, Colonel McCarrison reaches the following conclusions—namely, that dietaries which are deficient in vitamines, and in protein, and at the same time excessively rich in starch, or in fat, or in both, are potent sources of disease, and especially of gastro-intestinal disease. An excess of fat, in association with deficiency of water-soluble B vitamine and protein, and superabundance of starch, is peculiarly harmful to the organism. He found also that certain dietetic deficiencies greatly favoured the invasion of the blood and tissues by bacteria: especially was this the case when deficiency of vitamines and protein was associated with an excessive intake of starch. As life cannot be maintained in monkeys (*Macacus sinicus*) for much longer than a hundred days on a dietary almost wholly

devoid of water-soluble B vitamine, it would appear that complete absence of this vitamine from the food of human beings is of less practical importance from the point of view of disease production than is its subminimal supply. Complete deprivation of water-soluble B vitamine, especially in the presence of imperfect balance in other essential requisites of the food, will lead to rapid dissolution and death; subminimal supply of this vitamine will lead, in like circumstances, to slow dissolution and disease.

Finally, Colonel McCarrison makes the important suggestion, and one which must be of special interest to medical men in general practice—namely, that the findings recorded by him may afford some explanation of the genesis of that great mass of ill-defined gastro-intestinal disorders and vague ill-health which forms so high a proportion of human ailments at the present day.

MINERS' NYSTAGMUS.

IN the *British Journal of Ophthalmology* for April there is a full report of the important discussion organised by the Illuminating Engineering Society upon the illumination of mines, with particular reference to miners' nystagmus. The chairman justly remarked that Dr. T. Lister Llewellyn, who opened the discussion, had produced an enormous amount of evidence in favour of the view that the essential cause of miners' nystagmus is deficient illumination. On the present occasion the chief interest of Dr. Llewellyn's paper depended on the practical measures which he recommended to improve illumination. Incredible as it may seem, the source of light which gives the highest candle-power at the coal-face is the tallow candle. By carefully spreading out the wick two candle-powers may be obtained. In mines where there is a danger of fire-damp open lights cannot be used. The modern oil safety-lamp rarely gives more than one-half candle-power, and the modern electric lamp in use gives about one candle-power. The introduction of electric lamps has already effected a certain improvement in the conditions in many mines, but its light is still insufficient, and any possible improvement is necessarily limited by the weight of the battery. By bringing the light as near as possible to the surface of the coal-face which is being worked upon something can be done. A form of cap-lamp was demonstrated at the meeting which, according to Dr. Llewellyn, met the requirements satisfactorily. The battery is carried in the miner's belt and connected with the lamp by a flexible wire, the weight being 2¾ lb. Mr. Bishop Harman suggested that inventors should turn their attention to the production of a vapour-lamp capable of giving an efficient and harmless light. Other speakers dwelt on other aspects of the problem—the quality and colour of the light, the possible toxic effect of gaseous emanations from the coal-face, and the undoubted fact that nystagmus is a disease of the nerve centres, rather than of the eyes, and that it has some relation to neurasthenia. A notable feature of the discussion was that no one was found to defend the view that the cramped position of the miner at his work is mainly responsible for nystagmus; this is in contradiction to the teaching of Mr. F. L. Hoffman's pamphlet, issued by the American Bureau of Mines, but the American report has no basis of personal experience. Whatever factors other than deficiency of illumination may enter into the causation of nystagmus, it is amply proved that the most important is the amount of light reflected from the surface of the coal at which the miner is working, and therefore the time is ripe for preventive action. There is, it appears, a Government inquiry now sitting on the subject, and there is also being arranged a joint inquiry of ophthalmic surgeons and lighting engineers. There ought soon to be some practical result of so much deliberation.

ADVERTISEMENTS IN THE MEDICAL PRESS.

IN a recent number of THE LANCET[1] a report appeared of a meeting of the Worcestershire County Council at which considerable discussion took place with regard to certain salaries offered by the Council in connexion with their medical service scheme, and with regard to the attitude of the *British Medical Journal* and *The Lancet* towards advertisements of the posts in question forwarded to them by the Council. Both papers had refused to accept advertisements which offered a less salary than £500 per annum for such posts, and the Council, although warned by a medical member that on a former occasion of a similar character advertisements in the daily press had produced no replies, decided eventually to repeat the experiment. In particular, Mr. Willis Bund, the chairman, and Colonel Wheeler, the vice-chairman, protested, the former against allowing the medical press "to dictate" to the Council as to what salaries should be given, and the latter against the Council "sitting down" under the treatment thus accorded to it. Neither of these two gentlemen seems to have appreciated the position of these two papers, which exist not merely to supply the medical profession with information upon matters of interest to it, including opportunities for competing for public appointments, but also in order to advance and maintain the interests of the profession by every honourable means. The possibility of a learned profession considering that a salary below a certain figure should not be offered to or accepted by its members should at least have been understood by Mr. Willis Bund, and that the organs of that profession should give expression to its views should not have appeared to him unnatural. He is a barrister, a member of a profession in which the strictest rules exist governing many questions of remuneration. We need only refer to the prescribed proportion to be borne by the junior's fee to that of his leader when counsel appear in court, or to the special conditions under which a barrister is briefed on a circuit of which he is not a member, in order to remind any lawyer of the existence of these rules. They refer, it is true, to strictly professional work for which barristers are "briefed," and we are not aware of any interference with the acceptance of appointments. In other words, individuals can be sweated if they choose, and their profession makes no effort on their behalf. At the same time, we conceive that if the Government were to decide, for example, that the remuneration of county court judges or masters of the High Court was to be reduced for future appointments by 50 per cent. the bodies representing the two professions would have something to say by way of protest. So, no doubt, would the legal press, although its relations to the profession for which it caters hardly coincide with our own, and might not

[1] THE LANCET, May 1st, 1920, p. 979.

impose on it the duty of refusing to advertise underpaid posts for barristers and solicitors. There are, however, intrinsic differences between the two professions which affect the position which they occupy with regard to their members. We do not desire to advise lawyers as to what it is consistent with their dignity to accept by way of remuneration as members of a learned profession or as to what is necessary for their maintenance. Outside any such questions as these, there is, with regard to medical appointments, a more important point to be considered. The medical profession is responsible for the public health, and it realises that it is not in the public interest that posts should be held by men whose experience and training have not qualified them to do so with credit to themselves and with advantage to the public.

In the particular case under consideration the chairman actually admitted that he had had a letter from the Ministry of Health stating that tuberculosis officers should have special qualifications and experience, and expressing a doubt as to whether the salary offered would be sufficient to secure them. Mr. Willis Bund "objected to this sort of pressure being put upon local authorities." We can only express our satisfaction at the attitude taken up in the public interest by the public authority. For ourselves, if refusal to insert the advertisements of the Worcestershire County Council should appear to that body to be arbitrary or dictatorial, we would assure its members that it is neither. It is due to our full appreciation of the requirements of the Council and of those of the public with the care of whose health it has been entrusted.

IODINE DISINFECTION.

THE efficiency of disinfection of the skin with iodine has recently been the subject of painstaking investigations by Dr. Johan Seedorf,[1] a countryman of Professor Rovsing, whose criticism of this popular method of disinfection has done much to prevent its acquiring the unimpeachable security of stereotyped orthodoxy. Rovsing's indictment, it may be remembered, was supported by cases in which tetanus or gas phlegmon developed in spite of preoperative treatment of the skin with iodine. Dr. Seedorf's investigations were made both in vivo and in vitro. With regard to the latter, he found that iodine (0·1 per cent.) in an aqueous solution of potassium iodide kills staphylococci in one minute, but tetanus spores only after two hours. This disinfectant action of iodine increases with the strength of the solution only up to a certain point; its maximum efficiency is exhibited by a 1 per cent. solution. In confirmation of earlier investigations, it was found that, though alcohols readily kill the ordinary bacteria, their action on the spore-forming group is very slight, whereas that of iodine is much more effective. The effect of iodine on the skin was studied on rats' tails as well as on human skin. It was noted that the disinfectant action of iodine on a rat's tail was not checked by previous washing with soap and water, and this was so whether the skin was still moist or not after the washing. The same observation was made on the human skin, and this point is the more interesting as some advocates of iodine disinfection have insisted on dryness of the skin being an essential preliminary to the application of iodine. Dr. Seedorf made a series of interesting comparative investigations into the effect of iodine sterilisation as practised in three different surgical departments. All used a 5 per cent. solution of tincture of iodine, but the ritual differed in the various departments according to the inclination of each surgeon and the urgency of the operations. At the beginning of each operation a piece of skin, which had been treated with iodine, was excised and submitted to a bacteriological examination. Although the skin was found to be sterile only in 42 per cent., healing by first intention was effected in 90 per cent. of the cases in which drainage was not maintained. In 3 per cent. abscesses formed in the operation wound, and stitch abscesses formed in 7 per cent. In all these post-operative septic cases the excised portions of skin yielded micro-organisms. But in spite of these shortcomings Dr. Seedorf recommends iodine disinfection, especially when it is preceded by mechanical cleansing, and when three paintings of iodine are given at intervals of five to ten minutes during the last half hour before operation. He employs a 1 per cent. solution of iodine dissolved in 96 per cent. of ethyl-alcohol. If time permits there should be an interval of about 12 hours between the soap-and-water cleansing and the application of the iodine. In emergencies soap-and-water washing should be omitted in order that repeated applications of iodine may be made.

[1] Acta Chirurgica Scandinavica, 1920, vol. lii., Fasc. v.

THE CARE OF EPILEPTICS IN AMERICA.

THE twenty-sixth annual report of the New York State (Craig) Colony for Epileptics contains, as in former years, a good deal of pertinent material by the medical superintendent, Dr. W. T. Shanahan, about the care of epileptics. Dr. Shanahan lays stress on the importance of individualisation in treatment, pointing out that the whole of the environment, including diet, drugs, and especially occupation and education, must be considered along individual, rather than along general, lines. Not the least important factor in this environmental adjustment is the appointment and retention upon the staff of the best type of men and women; and Dr. Shanahan pleads for money to provide suitable diversion and recreation for the employees who have to live, day in and day out, among the patients. Such expenditure, he rightly argues, would be an indirect but effective means of treating the patients themselves. Little appears in this report about the use of bromides. Those who have followed the work at the Craig Colony will remember that between 1904 and 1915 the average daily dose of bromide was reduced from 20·5 to 0·6 gr. per patient, and that during the same period the incidence of fits was, if anything, rather diminished. Dr. Shanahan continues to report favourably upon this very restricted use of bromide, and remarks that cases of status epilepticus and serial seizures have been much less frequent than in former years, when bromides were used more freely. The omission in the report of any reference to psychogenic factors in epilepsy or to psycho-therapeutics in its treatment is surprising, as Dr. Pierce Clark, visiting neurologist to the colony, has long been recognised as a pioneer worker in this aspect of the ætiology and treatment of the disease. Epilepsy is essentially a disease arising in childhood; and it is during childhood that general environmental adjustment is of paramount importance; for it is then that we have

the best chance of arresting fits, and of combating retarded or abnormal mental development. It is a pleasure, therefore, to note that a supervisor of education is to be appointed, for the first time, at the Craig Colony. One only regrets that the colony school is so small and financially limited.

A few statistics will best indicate the present scope of the work. The number of patients at the colony is 1350, and they are under the charge of ten resident and eight visiting medical officers—an allowance which strikes us in this country as very generous. Of 5000 patients admitted since the opening of the colony, only 10 per cent. are reported as being mentally normal or approaching that level, while 10 per cent. showed signs of paralysis originating at birth or in infancy. Some 3700 patients have left the colony, of whom more than half were removed by death, 4 per cent. to insane asylums, and only 2·4 per cent. were reported as recovered, the standard of recovery being freedom from seizures for two years or longer. The net cost per head has risen slightly, from $268 in 1914 to $290 in 1919. One of the most valuable features in the Craig Colony reports is to be found in the post-mortem records. There are 103 of these in the present volume, making a total series of 1039 autopsies on epilepsy. The classification of the findings might not be generally acceptable. For instance, of the 103 brains examined this year, we are astonished to learn that no less than 89 per cent. were found to show "definite gross lesions." This surprising figure is arrived at by including among definite gross lesions such conditions as congestion, anæmia, or œdema of the brain, icteric colouring of the brain, asymmetry of the calvarium, and even bruises of the scalp.

TRANSIENT PERICARDIAL FRICTION IN CORONARY THROMBOSIS.

IN the *Albany Medical Annals* for April Professor L. W. Gorham has called attention to a sign of coronary thrombosis which has been almost unrecognised — transient pericardial friction. He reports six cases, in three of which the diagnosis was verified by necropsy. The following is an example:—

A lawyer, aged 57, whose health had been excellent, was seized with severe pain on Dec. 24th, 1917, while walking up a rather steep hill several hours after luncheon. When he sat down the pain ceased. Next day after the evening meal the pain recurred when walking and ceased on resting. In the evening it returned, with much belching of gas. About an hour after going to bed he was seized with agonising pain under the sternum. When seen at 3 A.M. his chief difficulty was severe substernal pain and an effort to vomit or belch gas. The pain did not radiate to the arm. His colour was grey, with slight cyanosis. The pulse was 100, full, bounding, and of high tension. Morphine hypodermically and nitroglycerine failed to relieve the pain. After four hours he felt easier. A complete examination was not made until next morning. There were ashy cyanosis, slight œdema of the bases of the lungs, increase of cardiac dullness to the right, rather distant regular heart sounds, and a delicate to-and-fro friction rub. The blood pressure was 120 systolic, 70 diastolic. For five days there was fever up to 101° F., with a pulse of 110 to 120. The friction came and went. Under rest and digitalis he gradually improved and the pulse and temperature became normal on the ninth day and the rub disappeared after two weeks. Suddenly, without warning, he died in bed on the thirty-seventh day after the onset. The necropsy showed the right heart and left ventricle considerably dilated. The anterior wall of the left ventricle in the area supplied by the anterior branch of the left coronary artery was thinned and softened and in the middle was a yellowish area of necrosis. Over the area of softening there was slight roughening of the epicardium and irregular areas of ecchymosis. The right coronary was narrowed by calcification. The left coronary was also calcareous and occluded by a friable reddish thrombus, but the distal parts of the coronary arteries appeared normal. The aortic valves were thickened. The papillary muscles had a yellow to greyish mottled appearance.

The six cases showed the following points of similarity.

1. Sudden attack of agonising pain, usually substernal, frequently radiating to the left arm and of longer duration than in an ordinary attack of angina, often lasting for several hours. Following this pain or soreness might persist for days. In some cases the pain was referred to the epigastrium, suggesting an abdominal catastrophe. The patient looked shocked, with ashy-grey moist skin and rapidly compressible pulse. (Such cases have been operated on). 2. Fever coming on usually in 24 hours and lasting four or five days. 3. A pericardial rub coming on within the first few days, transitory, often recurrent. 4. Signs of cardiac decompensation—tachycardia, arrhythmia, feeble heart sounds, falling blood pressure, increase of cardiac dullness to the right, disappearance of a systolic murmur present before, signs of œdema of the lungs, albuminuria, and, in late stages, general œdema. Morphine and nitroglycerine failed to relieve the pain. There may or may not have been attacks of angina pectoris preceding the seizure. Coronary thrombosis may occur where recent examination has failed to show evidence of cardiac or vascular disease. There may or may not be an exciting cause, such as over-exertion, over-eating, or excitement. All the cases except one were fatal, but one patient lived for three months after the first attack. One patient recovered and could work actively five years after the attack.

On turning to the literature allusions may be found to this clinical picture, but the text-books do not mention pericardial friction in coronary thrombosis. In 1884 Leyden described such a case but failed to interpret it correctly. In 1892 Kernig mentioned pericarditis following an attack of angina. In 1910 Sternberg described the syndrome in the *Wiener Medicinische Wochenschrift* under the designation "Pericarditis Epistenocardica." Professor Gorham's observations of six cases within a few years, taken with the fact that fibrinous pericarditis is not an uncommon post-mortem finding in coronary thrombosis, suggest that the condition is more common than might be supposed and that it has frequently been overlooked.

SYPHILIS OF THE PROSTATE

Dr. Loyd Thompson,[1] of Hot Springs, Arkansas, whose article on Syphilis of the Bladder recently received notice in THE LANCET,[2] has written an equally interesting paper on Syphilis of the Prostate, in which he reviews the literature and reports a personal case. Only 24 cases purporting to be syphilis of the prostate have been recorded, and of these only 12 can be accepted as authentic. It can therefore be concluded that the condition is either very rare or that it is seldom recognised. In 7 of the 12 authentic cases in which the time after infection is stated it varied from three months to 15 years. The age of the patients ranged from 18 to 62, the average being 40. The most frequent clinical symptom of syphilis of the prostate is pain which may be slight or

[1] American Journal of Syphilis, April, 1920.
[2] THE LANCET, April 10th, p. 828.

violent, and in some cases is independent of micturition, but in most cases is aggravated by the act. Pollakiuria is the next most frequent symptom, but in none of the cases was it very marked. A slight urethral discharge was noted in three cases, and in several a discharge was produced by prostatic massage. Less frequent symptoms are hæmaturia, a feeling of a foreign body in the rectum, painful defæcation, painful coitus, and more or less residual urine. As a rule the urine is somewhat cloudy, and contains pus, muco-pus, epithelial cells, and sometimes red blood corpuscles. There is nothing pathognomonic either in the symptoms or rectal findings, so that the diagnosis must be made by exclusion, the history, the presence or absence of other symptoms of syphilis, including the Wassermann reaction, and the results of specific treatment. The prognosis is good, as in all the authentic cases improvement, and in most complete recovery, occurred under specific treatment.

FEDERATION OF MEDICAL AND ALLIED SOCIETIES.

A MEETING of the Executive Council of the Federation was held on Thursday, May 27th, at 11, Chandos-street, Cavendish-square, when the report of the General Purposes Committee in regard to a submission from the Medico-Psychological Association of Great Britain and Ireland was considered, and it was resolved that a letter be sent to the Lord Chancellor, the Minister of Health, and the medical Members of the House of Commons urging the need of immediate legislation for the efficient treatment of mental disorders in their early stages. It was also reported that, in view of the request of certain nursing and allied organisations, a conference had been held, when the bodies chiefly concerned had agreed to the following resolution:—

"That there should be on the Consultative Council of Medical and Allied Services of the Ministry of Health a qualified nurse, who should also be a qualified midwife, and who at the same time should represent the masseuses and sanitary inspectors."

The Executive Council resolved to support this resolution by forwarding a letter on the matter to the Minister of Health and the medical Members of Parliament.

A discussion of the Interim Report of the Consultative Council of Medical and Allied Services of the Health Ministry followed, the value of which was enhanced by the good attendance present and by the fact that Lord Dawson, who is a member of the Council, answered very fully many questions which arose during the discussion. It was considered that a public and independent inquiry into the working of the National Insurance Medical Benefit and a census of the hospital beds in the country were necessary preliminaries to many of the reforms advocated. The following organisations, which had applied for corporate membership of the federation, were elected:—London and Counties Medical Protection Society, National Union of Trained Nurses, School Dentists' Society, Women Sanitary Inspectors and Health Visitors' Association. The names of 42 medical men and women were submitted as applicants for associate membership and were declared duly elected. The Medical Committee of the House of Commons has nominated Captain W. E. Elliot, M.P., its secretary, as a watching representative on the Executive Council of the Federation, and Captain Elliot was elected a member of the Council.

THE TREATMENT OF LEPROSY.

AN account was given in THE LANCET of May 1st of the general recommendations of the Calcutta Leprosy Conference, since which the papers on the treatment of the disease read before the conference have been published in India (*Indian Medical Gazette*, April), which furnish important confirmation regarding the value of Sir Leonard Rogers's method of injecting soluble preparations of the unsaturated fatty acids of chaulmoogra and other oils, together with some further progress of his researches.

During the past year reports have been received of the trial, organised by the Mission to Lepers, of both sodium gynocardate intravenously and sodium morrhuate subcutaneously and intravenously from 13 leper asylums, an analysis of which was read by Dr. E. Muir, who had previously recorded favourable results from this line of treatment. Although many of the cases were advanced ones and the treatment was not long enough (in some cases not exceeding two months) to afford the best results, yet in 300 cases improvement was noted in 72 per cent. and much improvement in 32 per cent., including several cases in which the lesions entirely disappeared. The results were practically the same with both drugs, although most of the observers thought the gynocardate was more effective in anæsthetic cases, but more troublesome to carry out on account of its irritant effect on the veins. Dr. Muir concludes: "The result of this widely carried out experiment can leave but little doubt that a distinct advance has been made in the treatment of leprosy." An interesting report by Dr. Ernest Neve of his trial of the drugs in Cashmir is also recorded, as well as a suggestive paper by Dr. Muir on the after-treatment of the disease. A paper by Dr. M. Cathew, of Siam, reporting the further progress of his trial of sodium gynocardate A was also read, and is of interest owing to the longer duration of his trial, which he summarised as follows: In 4 the lesions have completely disappeared for from 6 to 18 months; in 8 there is very marked improvement, although in 2 of them there has been some retrogression; in 1 general improvement, in 1 slight improvement, and in none no improvement. Four other cases were lost sight of, 2 of whom had very greatly improved.

Sir Leonard Rogers also summarises his results up to date in 71 cases as showing 1 not improved, 12 slightly improved, 32 greatly improved, and 26 lesions disappeared, and mentions 4 of his earlier cases who have now remained free from all visible signs of the disease for over two and a half years. Six of his later series have remained free for over a year, but he records 5 relapses due to early cessation of the treatment, and states that it is too early to speak of permanent cures in this series. He goes on to point out that the success of sodium morrhuate in leprosy establishes the important principle that other unsaturated fatty acids than the peculiar series found in chaulmoogra oil are of value in the treatment of leprosy, which has led him to make further preparations from oils with a high iodine value, indicating a large proportion of these substances. One of these made on this theory from soya bean oil has proved to be practically unirritating on injection into patients, while a short trial indicates that it is considerably more active in leprosy than previous preparations, thus holding out hope of still further advances in the near future, when an experienced whole-time investigator will take up the research in the Calcutta School of Tropical Medicine.

A paper in the same issue of the *Indian Medical Gazette* is worth attention. It is on the use of sodium morrhuate in advanced pulmonary tuberculosis. The subjects, who had tubercle bacilli in the sputum, were 28 sepoys at Quetta; at the date of the records 8 (in addition to 4 early cases) had been discharged cured by a medical board and 6 more were fit for discharge (and were passed by the board a little later), 4 were improving, 4 were worse, 3 were

in a stationary condition, and 1 died before more than two or three injections could be given. Even allowing for the favourable dry climate of Quetta these results, obtained in five months, are very encouraging.

THE TRAGEDY OF LOUTH.

THE Ministry of Health has been prompt to initiate measures for the prevention of any epidemic evils that might follow on the complete destruction of a large area of the town of Louth. The structural repair of the damaged drainage system is to be immediately taken in hand, and strict injunctions have been issued that all drinking-water should be boiled. The work of salvage is proceeding under the eyes of medical officers sent down from the Ministry, and every precaution is being taken that the tragedy of the flood should not be followed by the tragedy of disease.

THE LEAGUE OF RED CROSS SOCIETIES: THE MEDICAL ADVISORY BOARD.

A PROGRAMME of the General Medical Department of the League of Red Cross Societies has been drawn up by Dr. Richard P. Strong, general medical director, in anticipation of the first annual conference of the Medical Advisory Board of the League, which will meet in Geneva on July 5th. Eight nations will be represented at this conference by distinguished members of the medical profession, whose duty it will be to consider this medical programme, to make recommendations upon it, and to advise concerning the medical work to be undertaken by, or in the name of, the League. Belgium, Brazil, Denmark, and Japan each contribute one of the Board's 15 members; Italy has 2 representatives; and France, Great Britain, and the United States each send 3 delegates.

Dr. J. Bordet, director of the Pasteur Institute at Brussels, is the Belgian member of the Board. Brazil is sending Dr. Carlos Chagas, director of the Oswald Cruz Institute at Rio de Janeiro. From Denmark will come Professor T. H. Madsen, of the State Serum Institute at Copenhagen, while the Japanese representative is Professor Kinnosuke Miura, of the Imperial University of Tokio. Professor Dr. Giuseppe Bastianelli, physician and pathologist to the Polyclinic Hospital at Rome, and Professor Aldo Castellani, professor of tropical diseases at the London School of Tropical Medicine, constitute the Italian delegation. The French members of the Board are Professor Emile Roux, director of the Pasteur Institute at Paris and chairman of the Cannes Conference, at which the League of Red Cross Societies was organised; Professor Albert Calmette, subdirector of the Paris Pasteur Institute; and Dr. Léon Bernard, professor of hygiene at the University of Paris. Great Britain is represented by Colonel S. Lyle Cummins, professor of pathology at the R.A.M.C. College, London, and during the war adviser in pathology to the British armies in France; Sir Walter Fletcher, secretary of the Medical Research Committee; and Sir George Newman, chief medical officer of the Ministry of Health. Dr. William H. Welch, director of the School of Hygiene and Public Health of the Johns Hopkins University; Dr. Hermann M. Biggs, New York State Commissioner of Health; and Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research, will be the American members of the Board.

The Medical Advisory Board of the League of Red Cross Societies will at its first meeting elect its officers and adopt rules to govern its proceedings. The decisions of the Board, when approved by the chief officers of the League, will outline the medical policy to be pursued. While the regular meetings of the Medical Advisory Board will be held annually, emergency meetings may be called by the League's director-general or Board of Governors. In the intervals between meetings the members of the Advisory Board are kept informed by correspondence of the health work being undertaken or contemplated by the League. They, in turn, keep the general medical department of the League informed of the progress of health work in their respective countries, and call the attention of the League to any fields which they believe it may profitably enter.

IN Dr. George E. Morrison, Political Adviser to the Government of China, the medical profession has lost one of its most distinguished representatives, although his work of world-wide importance lay in other fields. The story of his adventures and wanderings, no less than of his statesmanlike activities, has been told during the week in the press of the country; his death while still in middle age and full of plans for the future is a deplorable event.

A DINNER will be held on Tuesday next, June 8th, at the Connaught Rooms, Great Queen-street, to celebrate the services of the Royal Army Medical Corps, and the civilians attached to it, during the great war. Sir Alfred Keogh will be the chief guest, and the Secretary of State for War, Mr. Winston Churchill, Field-Marshal Lord French, Field-Marshal Lord Haig, and many distinguished generals will be present. Lord Derby, Lord Midleton, Lord Edmund Talbot, General Seely, Mr. H. J. Tennant, and Colonel Sir Edward Ward are acting as a committee, and all communications should be addressed to the last named at 10, Grosvenor-street, S.W.

THE retirement of Sir John Bland-Sutton from the active staff of the Middlesex Hospital, where he was until to-day senior surgeon, is a thing to make us regret the remorseless passage of time. As a student and later as a member of the staff, Sir John Bland-Sutton has been associated with the Middlesex Hospital for 42 years, and the inception and endowment of the Bland-Sutton Institute of Pathology, a remarkable piece of individual generosity, is only one of the many advantages to the hospital which can be traced to his efforts. His release from active hospital work will enable Sir John Bland-Sutton to give still more time, as President of the Association of British Surgeons, to the scientific side of medicine, the development of which he has so much at heart.

A MEMORANDUM on clinical units in medical schools has been issued during the week by the University Grants Committee, 12, Old Queen-street, Westminster, stating the case for the units, and detailing the acts of legislation and the official or other reports which have led to their establishment. The memorandum sets out the advantages and also the drawbacks which may attend the latest development in medical education, and enumerates the essentials of the clinical system. These may be summarised as the provision of satisfactory training for the students in suitable and properly correlated hospitals and schools under appropriate and competent persons. It is postulated that the professor or director should devote the greater part of his time to teaching, treatment, and research, should have control of hospital beds and an out-patient department, ample laboratory accommodation and scientific equipment, and an adequate whole-time and part-time staff.

THE GENERAL COUNCIL OF MEDICAL EDUCATION AND REGISTRATION.

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THE opening of the summer session of the General Medical Council took place on June 1st, under the presidency of Sir DONALD MACALISTER. It was announced that Mr. H. J. Waring would be absent for the session in the United States, and that Dr. David Hepburn found the pressure of examinational work too great to allow of his attendance.

President's Address.

In his opening address he recorded the retirement of Dr. David N. Knox, Sir Bertram Windle, and Sir Charles Tomes, treasurer to the Council since 1904, and paid a tribute to their past services. He then welcomed as new members: Dr. James A. Adams, representative of the Royal Faculty of Physicians and Surgeons of Glasgow; Dr. R. A. Bolam and Mr. E. B. Turner, Direct Representatives of the practitioners of England and Wales; and Mr. Norman G. Bennett, appointed by the Crown, in place of Sir Charles Tomes. Sir Donald MacAlister congratulated the following members of the Council on whom honours had been conferred—K.B.E.: Sir James Hodsdon; C.B.E.: Colonel Waring, Dr. Caton, and Dr. Langley Browne; O.B.E.: Mr. Cockington. He continued:—

"Under the Ministries of Health Acts, Consultative Councils, for the purpose of advising the respective Ministers in regard to medical and allied public services, have been constituted in the three kingdoms, and are already at work. To all of them members of this Council have been appointed, and it will thereby be kept in touch with their activities. A number of draft and other Orders in Council under the Acts have been transmitted for its consideration to the Executive Committee; but so far none of these have dealt with questions other than administrative and formal. On May 17th an Order was issued giving effect to a desire of the Executive Committee, by which the duties of the Secretary of State in regard to the Anatomy Acts are in England and Wales transferred to the Minister of Health. It is to be hoped that the new arrangement will lead to much-needed improvements in the provision made for the practical teaching of anatomy and surgery.

Acting on your instructions, I was enabled by the courtesy of the Lord President to call the attention of the English Minister of Health to an apparent omission from the Nurses Registration Bill introduced by him. No provision was made, as in the Midwives Acts, for communicating the rules framed by the General Nursing Council to the Executive Committee before approval by the Minister. Dr. Addison considered the point, but decided that such a provision was in this case unnecessary, as the rules in question, unlike those of the Central Midwives Board, do not purport to 'regulate the practice' of nurses, but deal mainly with details of administration. Moreover, such rules have, unlike those for midwives, to be laid before Parliament prior to approval. The Minister accordingly did not favour any amendment of the Bill in the sense suggested, and the Lord President concurred in his view. The point will, however, have to be kept in mind, should it hereafter be proposed to make rules, under statutory authority, for 'regulating the practice' of nurses in surgical and medical cases, as that of midwives is regulated in obstetrical cases. Sir Jenner Verrall has been appointed a member of the General Nursing Council for England, and will, no doubt, keep us informed on the subject."

The President then referred to the reintroduction by Sir Henry Craik of Lord Morley's Bill of 1912 for the extension of the time allowed to prepare for the election of Direct Representatives to the Council, and for providing that in general such elections shall be held simultaneously. If the measure passed into law, he said, considerable economies on the part of the branch councils and of candidates would be effected, and the convenience of the electors would be better served.

The legislation for the amendment of the Dentists Act, he said, had not yet been initiated in Parliament, though it was stated officially that draft Bills were soon to be introduced. It appeared that one Bill would be required to deal with dental registration; and that other measures would be necessary to give effect to such proposals for the improvement of dental service as were set forth in the Report of the Departmental Committee on Dental Practice—these had already been considered by the Council. It would be necessary to instruct either the Executive Committee, or a special committee appointed for the purpose, to watch the progress of legislation during the summer, and to take such steps as might be required to ensure that effect was given to the conclusions of the Council. Sir Donald MacAlister commented with approval on the Dangerous Drugs Bill, which imposed restrictions on the import, export, manufacture, and sale of opium, cocaine, &c., with the object of preventing dangerous abuse of these drugs. He pointed out that it gave power to the Government to make regulations for the issue by medical practitioners of prescriptions containing any such drug, and for the dispensing of such prescriptions. During the war similar regulations were in operation, and the question of their continuance had now assumed an international aspect. The profession, which best knew the nature and extent of the evil, would probably be the first to welcome wisely-devised measures for checking it, even if these embodied some fresh restrictions upon professional freedom. He continued as follows:—

The Registers.

"The new Medical Register confirms the forecast on which I ventured in November.[1] On the Home List only 872 practitioners were registered in 1919, but no fewer than 450 were registered in the Colonial and Foreign Lists. The result is that the total number (1322) of new names is higher than in any year since 1915. The proportion of women practitioners increases, and is likely to increase rapidly during the next year or two. I learn, however, on good authority that their services are in less demand than during the war, and that newly-qualified women are finding difficulty in obtaining suitable opportunities for professional work. Supply and demand will, no doubt, adjust themselves in time; but in view of the large entry of women students it is proper to warn those concerned that, in the meantime, individual disappointments may be encountered. The women students who are now well advanced in their curriculum may not all at once find openings for practice after attaining to qualification. The profession of medicine is, in regard to women, affected, like other occupations, by the return to civil life of large numbers of ex-Service men as students and practitioners. To these men the country owes special consideration, and they ought to receive it. But inevitably they tend to displace a proportion of the women who so capably carried on the work of the profession during their absence abroad.

The Medical Students' Register indicates that the depletion of our professional ranks by the wastage of the war will in a few years be much more than made good by the addition of newly-qualified men. No fewer than 3420 medical students (men and women) were registered in 1919, as compared with 1600 in 1914. The number of registrations, indeed, exceed by over 1000 the highest previously recorded—namely, in 1891—when for special reasons the number rose to 2405. The sudden increase cannot at once be met by a corresponding expansion of our educational resources, and the strain thrown upon the medical schools of the country is therefore for the time excessive. There is reason to think that most of the schools would welcome an ebb in the tide of applicants for admission, until it is seen that the profession can absorb the large numbers aspiring to enter it, and until more adequate provision is made for their effective instruction and training. In the departments of anatomy and operative surgery, of midwifery, and of clinical medicine, the existing provision is no longer fully adequate to the new demands.

The Dentists' Register is stationary. The figures for the last three years are respectively 130 (1917), 131 (1918), 128 (1919). But there is an assured prospect of an advance by the year 1922, for the number of dental students entered on the Register in 1919 has risen to 612, as compared with 294 in 1914. In order more clearly to mark the sources of supply, an improvement has been made in the Medical and Dentists' Registers, whereby the numbers of practitioners added respectively to the Home, Colonial, and Foreign Lists are set forth in separate tables.

The cost of paper and of printing has so risen that impressions of the Registers can no longer be produced at the present authorised price. It may therefore be necessary to approach the Commissioners of the Treasury with a request that the price may be fixed at a sum sufficient at least to cover the actual cost of production.

The cycle of inspections of qualifying examinations, ordered by the Council, has been begun. Some of the reports have been already received, and will be considered by the proper committees during this session. For the Public Health Examinations we have been fortunate to secure the services, as our inspector, of Dr. Robert Bruce Low, C.B., lately assistant medical officer of the English Local Government Board. For the Final Examinations for medical degrees and diplomas our inspectors are Dr. Howard H. Tooth, C.B., C.M.G., in medicine; Sir Hector C. Cameron, C.B.E., in surgery; and Sir William J. Smyly in midwifery. Members of the Council have also been good enough to act as visitors at one or more examinations, and as provided in the Standing Orders they will present their separate reports to the committees concerned."

Education and Examination Committees.

Sir Donald MacAlister said that the Education Committee was considering the question of instruction in medical ethics and the relations of practitioners to the State, the teaching of practical midwifery, and the place assigned to the preventive aspects of medicine in the curriculum of professional study. The time was ripe, he urged, for some "reconstruction" in respect of the extent and content of the several stages and departments of the medical course. The Council was accumulating from various sources ample materials both for a survey of existing conditions and for a reconsideration of its own standing resolutions on professional education and examination. The Examination Committee would submit analyses of the annual tables furnished by the licensing bodies, and would also report on the practice of the licensing bodies in respect of teaching and examination in ophthalmology, with reference to the Council's resolution of last year. The Council's finances were in a satisfactory condition, since the treasurers had been able to report for 1919 a surplus of income over expenditure of £874.

Sir NORMAN MOORE proposed a cordial vote of thanks to the President for his address, with the request that

[1] THE LANCET, 1919, ii., 991.

he allow it to be printed and incorporated in the minutes of proceedings. In doing so, he alluded to the conferment on the President of his recent honour, Chevalier of the Order of the Crown of Italy, and expressed his own and his colleagues' warm congratulations.

Dr. NORMAN WALKER seconded and the vote was carried by acclamation.

Committees.

The following were appointed to constitute the Executive Committee: Sir Gilbert Barling, Sir Norman Moore, Mr. Waring, Dr. Macdonald, Dr. Norman Walker, Sir James Hodsdon, Sir Arthur Chance, Sir John Moore.

The selection for the Penal Cases Committee was: Sir Francis Champneys, Dr. Macdonald, Sir Norman Walker, and Sir Arthur Chance.

The constitution of the remaining committees was as follows:—

Business Committee.—Dr. Norman Walker (Chairman), the President, Sir Francis Champneys, Dr. Macdonald, Dr. Magennis.
Pharmacopœia Committee.—The President (Chairman), Sir Norman Moore, Dr. Hopkins, Dr. Russell Wells, Dr. Caton, Dr. Norman Walker, Sir John Moore, Dr. Kidd, Dr. Matthew Hay.
Finance Committee.—Sir Norman Moore (Chairman), the President, Sir James Hodsdon, the Junior Treasurer, Sir Arthur Chance.
Dental Committee.—The President (Chairman), Mr. Waring, Sir James Hodsdon, Sir Arthur Chance, Mr. Bennett (in place of Sir Charles Tomes).
Dental Education and Examination Committee.—Sir James Hodsdon (acting Chairman), the President, Mr. Waring, Sir Arthur Chance, Dr. Coey Bigger, Mr. Bennett (vice Sir Charles Tomes).
Students' Registration Committee.—Sir Norman Moore (Chairman), the President, Dr. Mackay, Dr. Littlejohn, Sir Gilbert Barling, Mr. Sinclair, Dr. Kidd.

The Council then went into committee.

WEDNESDAY, JUNE 2ND.

The Council proceeded to the consideration of penal cases.

TUBERCULOSIS SOCIETY:

A REPRESENTATIVE CONGRESS.

WE briefly announced last week (p. 1197) that under the auspices of this society a two-day Congress was held in Leeds on May 13th and 14th, with additional meetings at Bradford and Harrogate on the 12th and 15th. The Congress was representative of tuberculosis workers from all parts of the country, including Ireland. Dr. H. DE CARLE WOODCOCK (the President) occupied the chair.

Opening Addresses.

On May 13th the proceedings in Leeds were opened with an address by the LORD MAYOR (Mr. T. B. DUNCAN), in which he suggested that social conditions must be improved. Children must be taught to cultivate clean minds and thoughts, and then we might look forward to an A 1 nation, with strong bodies, vigorous minds, and healthy constitutions.—Sir MICHAEL SADLER welcomed the delegates on behalf of the University. We must, he said, develop a fine tradition in industry, family duty and purity, and nobler state of society. These were all factors in the cause we were out to win. —In his presidential address the PRESIDENT advocated more autocratic power for the medical officer of health, the abolition of slums, and the building of new houses which the tubercle bacillus would avoid. Research was needed to show us where we stood.—Professor BENJAMIN MOORE (Medical Research Committee) moved a resolution, seconded by Dr. A. TRIMBLE (Belfast):—

"That in the opinion of this Congress a conference should take place between those actually engaged in tuberculosis work and those engaged in research work, to arrange the lines on which future investigation should be conducted and the manner in which records should be kept and collated and their results circulated."

After the opening session the delegates were entertained to luncheon by the PRESIDENT.

Sectional meetings began in the afternoon.

Section A.—Tuberculosis and the Workers.

This was the subject of the first section at which Mr. S. SHUTER (H.M. Chief Inspector of Factories) took the chair.—Dr. TRIMBLE thought that tuberculosis was not caused so much by the actual occupation as the terms and conditions under which, and the wages for which, the people worked. Infection took place chiefly in childhood and education was essential to prevent development of the disease in later life. If only the tired worker could obtain the necessary rest 90 per cent. would become automatically cured.—Professor MOORE said that the cost of redeeming those affected with tuberculosis was a sound expenditure. If we could prevent 50,000 deaths a year we would be able to pay the whole war debt in a generation.—Special interest attached to the information given of the evils of the glass-bottle industry by Mr. FISHER (secretary of the Glass-bottle Makers' Society). The blow-pipes used by the men, which are in use 22 out of the 24 hours and pass from worker to worker without sterilisation, being a very probable method by which the disease is transmitted.—Mr. LANCASTER (Typographical Association) and Mr. COHEN (National Union of General Workers) also spoke of the inadequate wages in many trades where the minimum was also the maximum wage. The evils of underground workshops were also mentioned.

Section B.—Tuberculosis and Child Life.

The chair was taken by Mrs. ROBERT HUDSON, who very strongly advocated the attack upon the disease at the very earliest age, and the correction of ailments such as rickets, which were indirectly associated with tuberculosis.—Dr. A. E. L. WEAR (chief medical officer to the Leeds Education Committee) said that in the routine examination of 23,000 children in Leeds 128 cases of pulmonary, 126 glandular, and 66 cases of bone tuberculosis were found. Of 483 crippled children 90 suffered from some form of tuberculosis. Taking all the institutions in the country for tuberculous children together there was less than one place for every 1000 children in attendance. He strongly advocated open-air schools.—Dr. C. W. VINING (Leeds Infirmary) said that he was appalled at the extraordinary amount of chronic ill-health in the second year of life. The chronic catarrhs of early childhood were, he thought, due to defective feeding in the first three years of life. Poverty was not the cause unless it were poverty of commonsense and knowledge. The main defects were want of breast feeding during the first year, and a diet lacking in fat and protein, with excess of carbohydrates during the second year of life.

Section C.—Recent Advances in Treatment.

Dr. MARCUS PATERSON (Collindale Hospital, Hendon) spoke of the value of graduated work, and also deprecated the practice of over-fattening patients and then sending them home to face the rigors of everyday life in an unfit condition. Graduated labour and controlled auto-inoculation ought to be taught in every medical school.—Sir HENRY GAUVAIN (Treloar's Hospital, Alton) spoke of the recent advances in the realm of surgical tuberculosis, and showed lantern slides of the methods adopted.

Section D.—Farm Colony.

Dr. S. JACOB (travelling secretary of the National Association for the Prevention of Tuberculosis) took the chair. He described the limited scope of the sanatorium and the necessity of providing for the convalescent period, where a patient could in an open-air life complete the cure.—Mr. A. G. RUSTON (Lecturer in Farm Economics, Leeds University) spoke of the farming methods which would be most likely to prove successful in a farm colony.—Mr. G. W. ALLEN (chairman of the Association for Tuberculous Ex-service Men in Leeds) put in a strong plea for the establishment of village settlements as distinct from farm colonies, which could only be applicable to a small proportion of the men.

Section E.—The Education and Training of Patients Suffering from Non-Pulmonary Tuberculosis.

In the evening Sir HENRY GAUVAIN gave a lecture on the work at Alton, illustrated by lantern and cinema slides. The Lord Mayor later gave a reception in the City Art Gallery to the delegates.

Friday, May 14th, was devoted entirely to sectional meetings.

Section F.—Tuberculosis and the Housing Problem.

Dr. HALLIDAY SUTHERLAND (Marylebone Dispensary) said that everything should be done to discourage the growth of cities and to encourage the growth of semi-agricultural and semi-industrial communities in the country, as in France. The widespread ownership of property was the very greatest safeguard against Bolshevism and anarchy.—Dr. OSCAR HOLDEN (M.O.H., Dewsbury) spoke against consumptives living in back-to-back houses and urged the segregation of advanced cases. He suggested that definite areas should be set apart and patients with their families be put in suitable houses, with workshops provided so that they could earn, at any rate, part of their livelihood.—Councillor NOON (chairman of the Leeds Housing Committee) stated that there are 73,000 back-to-back houses in Leeds. He advocated new houses being earmarked for tuberculous families.—Dr. NOEL BARDSWELL (London Insurance Committee) deprecated the idea of compulsory segregation, which was impossible for a democratic country.

Section G.—Sanatorium Dietary and Milk Tuberculosis.

The chair was taken by Dr. J. JOHNSTON JERVIS (M.O.H., Leeds), who spoke of the absolute necessity of a clean milk-supply, and this should be the first consideration of the Government.—Dr. JANE WALKER (East Anglian Sanatorium) read a paper on Food Values in Relation to the Treatment in Sanatorium. She approved of three main meals a day both for adults and children.—Dr. JAMES WATT (Downs Sanatorium, Sutton) said that surprisingly little special diet was needed in the treatment of tuberculosis.—Mr. RUSTON and Dr. WOODCOCK contributed a joint paper on the Calorific Values of Foods. They advocated a quart of milk a day for each patient as being the best method of obtaining fat.

Section H.—Surgical Tuberculosis.

This turned almost entirely into a discussion of tuberculosis and milk.

Mr. S. W. DAW (Lecturer in Surgery, Leeds University) said that more than half the cattle in this country gave tuberculous milk, because the best milkers were most liable to have the disease.—Dr. H. A. ELLIS (Middlesbrough) contended that resistance was much more important than infection.—Dr. F. J. HENRY (Middlesbrough) regretted that experts should be so divided in opinion. Research was badly needed, with full collaboration and dissemination of information.—Mr. DAW, in reply, upheld the view that prevention was more essential than cure, that milk should be boiled and the vitamines lost replaced by alternative foods.

Section I.—Tuberculosis and the War.

Sir MONTAGUE BARLOW (Parliamentary Secretary to the Ministry of Labour) said that approximately 40,000 ex-Service men were affected with tuberculosis. The Government proposed to erect village settlements for these men, and he was confident that the money would be forthcoming with which to build them.—Dr. RAW said that if the scheme of village settlements could be carried out it would do more than anything else to cure the disease.—Dr. BARDSWELL mentioned that of 430 men discharged with tuberculosis in London 60 per cent. were already dead. Before settlements could be provided the rest would have shared the same fate.

Section J.—"Care Work."

Dr. JANE WALKER spoke from the point of view of the sanatorium officer. She had found great value in the patients' club, which encouraged them to keep in touch with her after leaving sanatorium. She was in favour of employing ex-patients on the staffs of institutions.—Dr. ELLIS advocated clubs where tuberculous persons might resort in their leisure hours. The whole question of tubercle was the question of after-care.—Dr. F. STANLEY TINKER (Surrey) was strongly in favour of local workshops for the employment of ex-sanatorium patients. This, coupled with an energetic educational campaign, would do far more than the scheme of residential industrial colonies, which could but touch the fringe of those needing assistance.—Dr. C. L. WILLIAMS (Dewsbury) thought that attention should be specially concentrated on the pre-tuberculous and the early case.—A resolution was passed advocating the initiation of a well-organised and adequate scheme of after-care in connexion with the medical treatment of the disease, either by the Government or the local authorities.

Section K.—Artificial Pneumothorax.

Dr. MORRISTON DAVIES (Vale of Clwyd Sanatorium) gave an address on the Methods of Collapse Therapy, which was illustrated by lantern-slides of X ray photographs.—Dr. S. VERE PEARSON (Mundesley Sanatorium) described the types of cases treated and results obtained.—Dr. Z. P. FERNANDEZ (Armley Hospital, Leeds) also spoke.

Section L.—Tuberculosis and Training of the G.P.

Dr. J. KAY JAMIESON (Professor of Anatomy, Leeds University) took the chair and urged the study of tuberculosis on wide lines.—Dr. J. LE FLEMING BURROW (Tutor in Medicine, Leeds University) referred to the political cry for nationalisation. He deprecated this because it discouraged initiative and research. Whole-time service was not beneficial, and a multiplication of special whole-time officers was not advisable. He urged that more should be spent on research and less on treatment; in this way the object would be obtained more easily. Many delegates in the evening visited Killingbeck Sanatorium and Armley Hospital, when a demonstration in artificial pneumothorax was given.

Section M.

An address was given, illustrated by kinematograph films, by Dr. HALLIDAY SUTHERLAND, on Consumption: its Cause, Cure, and Prevention.

INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS:

REPORT OF MEETING OF THE AMERICAN AND CANADIAN SECTION.

(FROM A CORRESPONDENT.)

THIS society held its thirteenth annual meeting at Cornell University Medical College, New York, Professor O. Klotz, of Pittsburg, in the chair, when Dr. Roy Miner, Associate Curator of the American Museum of Natural History, New York, was present as delegate from the American Association of Museums.

The programme was opened by addresses delivered by the Chairman and Dr. Maude E. Abbott on "The Pathological Collections and the Activities on Behalf of the Medical Museum and of this Association of the late Sir William Osler," which were received with deep appreciation.

A report on "The Central Bureau for North America for the Preservation of Microscopic Results of Medical Research," which was established by the Association some years ago, but has not yet been operated for lack of funds, was presented by Leo Loeb, of St. Louis, Mo., urging the importance of this bureau and the necessity for its immediate operation, and a resolution was passed authorising the Council to take steps to attempt to obtain a fund for the operation of this bureau and the adequate publication of the bulletins as a complete Index Pathologicus.

The Canadian National War Museum gave two important contributions, "Museum Records Illustrating Facial War Injuries," demonstrated by Major E. F. Risden, of Toronto, and "Lantern Slides from Water-colour Paintings, showing the Canadian Army Medical Arrangements at the Front," by Major G. A. Campbell, of Ottawa, and a smaller exhibit of "Pathological Specimens showing *Bacillus Aerogenes* Infections following Gunshot Wounds," by Major F. B. Curd, of Montreal.

Professor James Ewing, of Cornell, showed a large series of tumours of bone, which included some unusual forms of cell-neoplasm. F. S. Jackson, of Montreal, communicated notes on a new preservative fluid (formalin-sugar acting by absorption) for delicate specimens, and W. M. L. Coplin, of Philadelphia, a new method for the permanent mounting of Kaiserling specimens without immersion in fluid, which promises to be of much technical value.

Other items of interest were a detailed study by Edna G. Dyar, of Washington, on the technique of the "Preservation of Serial Sections of the Brain and Cord for Microscopical Study"; "Note on the Preservation of an Amyloid Spleen," by William Boyd, of Winnipeg; "The Teaching Value of the Small Museum Specimen," by O. Klotz, of Pittsburg; "A Method for Prolonged Preservation of Stock Cultures of Bacteria," by Homer F. Swift, of New York

"Demonstration Exhibit of Organism, Cultures, and Lesions in Acute Epidemic Encephalitis (Lethargica)," by Leo Loewe and Israel Strauss, of New York; "Stereoscopic Pictures of Dissections of the Actual and Accessory Muscles of the Eye," by S. E. Whitnall, of Montreal; "Dissection of a Case of Duplication of Œsophagus, Stomach, and Small Intestine, the Second Œsophagus communicating with Blind End of Foregut at Back of Neck," by A. C. Freedman, of Montreal; "Sympus Apus and Bipus," by S. Chelliah, Madras, India.

The following officers were elected for the ensuing year: President: W. M. L. Coplin, Philadelphia. Vice-Presidents: James Ewing, New York; Howard Karsner, Cleveland; H. E. Robertson, Minneapolis. Councillors: A. S. Warthin, Ann Arbor; O. Klotz, Pittsburg; R. A. Lambert, New Haven; C. F. Silvester, Washington, D.C.; W. G. MacCallum, Baltimore; Lawrence Rhea, Montreal. Secretary-Treasurer: Maude E. Abbott, Montreal. Assistant Secretaries: L. Gross, Montreal; H. Goldblatt, Cleveland.

Annual Exhibition.

The annual exhibition of the society of material illustrating papers upon the programme of this Association and of the Association of Pathologists and Bacteriologists was held also at Cornell on April 1st and 2nd for the benefit of both societies, and presented an attractive and comprehensive scientific display, which was largely attended and much appreciated.

Among the exhibits presented by the American Association of Pathologists and Bacteriologists were the following:—"Coarctation of the Aorta with Bicuspid Aortic Valve and Rupture of the Aorta," by Harry Goldblatt of Cleveland; "An Endothelial Leukocytosis by Injection of Saprophytic Tubercle Bacilli," by F. J. McJunkin of Milwaukee; "Tissue Reactions to Tubercle Waxes," by Flinn F. Morse of Detroit; "Glomerular Lesions in the Healed (Abacterial) Stage of Chronic Bacterial Nephritis," by George Baehr, of New York; "Monocytic Leukæmia," by N. Rosenthal, of New York; "Observations in Experimental Histogenesis of Experimental Tubercles in the Lungs of Vitally Stained Rabbits," by H. Chandler-Foot, of Boston; "Metaplasia so Illustrated in Leukoplakia of the Pelvis of the Kidney," by De Wayne G. Richey, of Pittsburg; "Defects of the Aortic Septum in Explanation of Congenital Aneurysms of the Right Aortic Sinus of Valsalva, with Associated Interventricular Septal Defect," by Maude E. Abbott, of Montreal; "Bone Syphilis in the Rabbit," by Louise Pearce and Wade H. Brown, of New York.

URBAN VITAL STATISTICS.

(Week ended May 29th, 1920.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18 million persons, the annual rate of mortality, which had been 13·8, 13·8, and 13·2 in the three preceding weeks, further declined to 12·8 per 1000. In London, with a population of nearly 4½ million persons, the annual death-rate was 12·1, or 0·1 per 1000 above that recorded in the previous week, while among the remaining towns the rates ranged from 3·3 in Hornsey, 5·4 in Enfield, and 6·6 in Ilford, to 19·3 in Middlesbrough, 25·5 in West Hartlepool, and 26·5 in Sheffield. The principal epidemic diseases caused 275 deaths, which corresponded to an annual rate of 0·8 per 1000, and comprised 108 from measles, 61 from infantile diarrhœa, 45 from whooping-cough, 40 from diphtheria, 15 from scarlet fever, and 6 from enteric fever. Measles caused a death-rate of 1·8 in Leicester, in Wigan, and in Newport (Mon.), 1·9 in Dudley, 2·5 in Acton and in Blackburn, and 2·6 in Rhondda. The deaths from influenza, which had been 201, 216, and 211 in the three preceding weeks, further fell to 188, and included 77 in Sheffield, 26 in London, 12 in Manchester, and 6 in Rhondda. There were 1797 cases of diphtheria and 1703 of scarlet fever under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 1894 and 1734 respectively at the end of the previous week; the last remaining case of small-pox was discharged during the week. The causes of 31 of the 4380 deaths in the 96 towns were uncertified, of which 9 were registered in Birmingham, and 3 in Manchester.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2½ million persons, the annual rate of mortality, which had been 18·4, 16·9, and 15·6 in the three preceding weeks, further declined to 14·2 per 1000. The 316 deaths in Glasgow corresponded to an annual rate of 14·8 per 1000, and included 10 from measles, 8 from influenza, 4 from diphtheria, 2 each from small-pox and infantile diarrhœa, and 1 each from scarlet fever and whooping-cough. The 92 deaths in Edinburgh were equal to a rate of 14·1 per 1000, and included 3 from infantile diarrhœa and one each from measles and scarlet fever.

Irish Towns.—The 152 deaths in Dublin corresponded to an annual rate of 19·1, or 2·4 per 1000 below that recorded in the previous week, and included 12 from whooping-cough, 7 from measles, 6 from infantile diarrhœa, 4 from influenza, and 2 from diphtheria. The 122 deaths in Belfast were equal to a rate of 15·4 per 1000, and included 3 from influenza, 2 each from measles, scarlet fever, and infantile diarrhœa, and 1 from enteric fever.

Correspondence.

"Audi alteram partem."

REPORT OF THE CONSULTATIVE COUNCIL: COÖPERATION OF RED CROSS.

To the Editor of THE LANCET.

SIR,—The report issued by the Consultative Council of the Ministry of Health (THE LANCET, May 29th, p. 1183) embodies recommendations which will necessarily entail a considerable increase in the work of transport of the sick and injured in this country, and the Council draw special attention to the necessity for an ambulance service.

I am happy to say that the Joint Council of the British Red Cross Society and the Order of St. John has been able to anticipate this demand and has, during the past 12 months, established over 300 motor ambulance stations throughout the country. That the need existed for an efficient ambulance service even before the establishment of the system of linked hospitals foreshadowed in the report, is shown by the fact that though a large proportion of the ambulances have been in service for only a few months they have already been the means of transporting over 12,000 cases.

The administration of our ambulances has been delegated through county directors to local organisations or public health authorities as circumstances dictated, but central control of the service is maintained at headquarters, and we are thus in a position to develop and extend the scheme on such lines as may prove most desirable to meet the needs of a coördinated health service.—I am, Sir, yours faithfully,

ARTHUR STANLEY,
Chairman, Joint Council, British Red Cross Society and Order of St. John.

19, Berkeley-street, W., May 29th, 1920.

THE STANDARDISATION OF COLOUR PERCEPTION.

To the Editor of THE LANCET.

SIR,—I do not wish in any way to depreciate Dr. Edridge-Green's work on colour vision, but I think that if, as is very possible, his work has been undervalued in the past, the pendulum has now swung in the opposite direction, and the work of others is being unjustly depreciated in his favour. Your own review of his book (THE LANCET, May 29th) is an appreciation which adopts a much more judicial attitude than is found in some other reviews which have appeared, and it is because I am convinced that it is the aim of THE LANCET to establish scientific truth and be just to all that I venture to hope that you will allow me to make a few remarks on one or two of your statements.

You attribute to Dr. Edridge-Green "the removal of the colour-discriminating faculty from the retina, where the theories of Helmholtz and Hering would place it, to the brain." When we remember that Helmholtz in his Physiologische Optik proved himself no mean psychologist, as well as mathematician and physicist, that Hering in his Lehre vom Lichtsinn treats specially the psychological aspects of the problem, and that numberless physiologists and psychologists have been more or less staunch adherents to one or other of the theories propounded by these authors, it is clear that these theories by no means ignore the part which the cerebral apparatus plays in the perception of colours. Dr. McDougall's papers in *Mind*, for example, deal profoundly with the cerebral apparatus of colour vision, and have received far less attention than is due to them. Von Kries, following Donders and A. Fick, quite definitely regards the three components theory as only a partial explanation, applicable, indeed, chiefly to the events taking place in the peripheral mechanism, which events are modified and transformed in the higher visual centres (theory of zones). That the events which occur in the peripheral apparatus of vision and audition are more complex than in any other sense organ would be admitted by Dr. Edridge-Green, and is, indeed, asserted

in his writings, and I imagine every psychologist would predicate important modifications of the nervous impulses in the cerebral centres, and some portion of the cortex as the sole nervous mechanism concerned in the conscious appreciation of the transformed impulses.

With regard to tests for colour-blindness I freely admit that I have personally adopted a perhaps too cautious and conservative attitude to innovations. Considerable experience in testing for colour-blindness has convinced me that the Holmgren wool-test is better discarded—not because it is so faulty as has been stated, but because it requires great experience on the part of the examiner and more intelligence than is to be expected of the examinee. Moreover, it is inherently objectionable to sailors and railway-men. But I would also point out that it is very easy for incompetent examiners to pass seriously colour-blind men with Dr. Edridge-Green's colour-perception lantern. I quite agree that it is a good test in the hands of an expert examiner, but prolonged experience has shown that the Board of Trade lantern is better, because it is more "fool-proof." If the Board of Trade had not adopted the unwise policy of disallowing the commercial exploitation of their lantern, I feel sure that it would have been generally used. The principles of this lantern were published in the report of the Departmental Committee on Sight Tests, and I am surprised that no one has put a lantern of this design on the market. If I had not been intimately connected with the Board of Trade examinations I should long ago have endeavoured to get this done.

I fear I have already trespassed upon your courtesy. I will only add that, although controversy in the press is thoroughly repugnant to me, I propose to deal more in detail with Dr. Edridge-Green's theories of vision elsewhere. I am, Sir, yours faithfully,

J. HERBERT PARSONS.

Queen Anne-street, Cavendish-square, W., May 29th, 1920.

ANOMALOUS VARIOLOID DISEASE.

To the Editor of THE LANCET.

SIR,—In dealing with cases such as reported by Dr. W. Allingham, and referred to in your editorial note of May 29th (p. 1179), the peril of delaying a diagnosis is obvious, and equally so is the difficulty of those responsible in giving a definite opinion with desirable quickness. Dr. Allingham would solve the problem by requiring "isolation of chicken-pox for 10 days." But it is not apparent that this would do more than provide time for much professional contention by local practitioners favouring opposite opinions, whilst case after case appeared without decisive classical signs—a state of affairs well illustrated on the first appearance of the "mild type" of small-pox in Australia in 1913. The Leicester school makes this difficulty the chief doctrine of its practice in not urging infantile vaccination—unmindful of possible mortality—so that the practitioner may have the advantage of demonstrations of unmodified small-pox! This is a method of facilitating diagnosis which, happily, is not likely to find much favour beyond the confines of Leicester. Hence, I venture to make an addition to Dr. Allingham's useful suggestion which could be put in force at once by notifying selected existing laboratories throughout the country, and would be easy of adoption on coming into force of the recent scheme of the Ministry of Health for "Medical and Allied Services"—namely, isolation of cases of suspected varicella or small-pox pending a decision arrived at in the laboratory of a "Secondary Health Centre." Here the allergic test in rabbits previously sensitised by anti-smallpox vaccine could be employed. According to Dr. John Nivison Force and Helen Howell Beckwith[1] on intradermal inoculation of the contents of the dubious vesicles, a diagnosis of variola may be arrived at if there be a cutaneous reaction within 48 hours. Probably the reaction would be more readily demonstrable were calves used instead of rabbits. It will be remembered that the laborious experiments by Dr. W. G. Armstrong,[2] Senior Medical Officer of Health, New South Wales, associated with Dr. Burton Cleland and Dr. E. W. Ferguson, have removed all doubts so far expressed that the American "mild type" of small-pox imported to Australia, and which I think it more reasonable to dub the "amaas strain" (and thus relieve our cousins from being regarded as the *fons et origo mali*), is of the nature of variola. On the other hand, W. Stoelzner[3] has shown that in an epidemic of varicella during the war the type was so virulent that, both in regard to constitutional symptoms and character of the vesicles, there was a close resemblance to variola.

I am, Sir, yours faithfully,

W. G. KING,
Colonel, I.M.S. (Ret.)

May 29th, 1920.

[1] Jour. Amer. Med. Assoc., 1915, August 14th, vol. lxv., No. 7, pp. 588–593.

[2] Report of the Director-General of Public Health, New South Wales, 1913.

[3] Quoted by the Bulletin de l'Office International d'Hygiène Publique, p. 1344, vol. ii., No. 12.

To the Editor of THE LANCET.

SIR,—Referring to the annotation on Anomalous Varioloid Disease in your issue for May 29th, and to the paper by Dr. W. Allingham in the same issue, to which you refer, it may be of interest to state that I had the opportunity of seeing, in consultation, not only Dr. Allingham's cases, but also a further series of cases directly related to them which subsequently came under observation at West Ham. The infection was conveyed by the son of one of the Orsett cases, who visited his father at Grays for three days, during which time father and son slept in the same bed. This man and seven children have all since been attacked by the disease.

There can, in my opinion, be no doubt but that the type of the disease with which the Orsett and West Ham cases have been affected is similar to that experienced in the earlier outbreak to which you refer as having been investigated recently by myself in a limited area on the borders of Norfolk and Suffolk. In both outbreaks the symptoms and general course of the disease more nearly resembled those of alastrim than of typical small-pox.

I am, Sir, yours faithfully,

S. MONCKTON COPEMAN.

May 31st, 1920.

THE CLINICAL DIAGNOSIS OF DIPHTHERIA.

To the Editor of THE LANCET.

SIR,—Whilst recognising fully the value of Dr. H. Drinkwater's observations on the naked-eye appearance of the fauces in diphtheria, there are a few points where danger to the patient would arise if they are relied upon—as the trend of his article seems to me to suggest—as an alternative to bacteriological investigation of the lesion.

(*a*) "In diphtheria the patch is raised above the level of the mucous membrane." Here the danger lies in eliminating coexistent scarlet fever and diphtheria, where the lesion frequently consists of a loss of surface without any raised deposit, and is followed by diphtheritic toxæmia and paralysis. Such cases are commonly seen on admission to every large fever hospital.

(*b*) "If the deposit is single in each affected area the disease is either diphtheria or Vincent's angina ..... in the period of growth." This feature, whilst useful in children, is fallacious in adults. Repeatedly have I seen true diphtheria on the first day of the disease (in nurses especially) with a distribution of the deposit indistinguishable from that of follicular tonsillitis.

(*c*) It is a pity that Dr. Drinkwater's paper makes no allusion to scarlet fever. In children this complaint may give rise to faucial appearances over-riding every one of the postulates in his paper, and is in practice *the* disease in which the differential diagnosis is most important.

(*d*) "A bacteriological examination may mean a delay of 24 or 48 hours, with possibly disastrous results." Certainly, if the criminal mistake is made of waiting for the result before segregating the patient and administering antitoxin. But does any careful practitioner do this nowadays?

If Dr. Drinkwater's precepts are largely followed I think that the uncomfortable—and sometimes tragic—occurrence in convalescence of diphtheritic heart failure or paralysis in a patient whose case had been diagnosed as non-diphtheritic, will be much more frequent than it now is. Moreover, many of these cases of "tonsillitis"

may also peel and develop scarlatinal nephritis! The danger lies not in Dr. Drinkwater's relying on his own skilled eye and careful observation, but in others attempting to follow him without bacteriological assistance; hence the warning note in this letter.

I am, Sir, yours faithfully,

A. KNYVETT GORDON,
Formerly Medical Superintendent of the Manchester City Fever Hospital and Lecturer on Infectious Diseases in the University.

Bedford-square, W.C., May 31st, 1920.

To the Editor of THE LANCET.

SIR,—Dr. H. Drinkwater's article in your columns last week upon the diagnosis of diphtheria and throat exudations is one of those things that make the reader ask if it is not too good to be true. The author may have deceived himself, even while we admit the obvious sincerity of his observations as well as the good opportunities which he enjoyed while making them.

If Dr. Drinkwater's experience proves to be borne out by other physicians, clinical observation will be greatly in his debt.

I am, Sir, yours faithfully,

May 29th, 1920. A VETERAN.

THE SURGICAL TREATMENT OF UTERINE AND VAGINAL PROLAPSE.

To the Editor of THE LANCET.

SIR,—In your issue of May 15th my friend, Dr. W. E. Fothergill, complains that my interpretation of his words is not correct. I greatly regret that I should have misunderstood them, for they are quite clear; but, perhaps, by so doing I shall prevent everyone who reads the same words from falling into a similar error. Nevertheless, the views expressed in my lecture remain unchanged in regard to the importance of puerperal retroflexion and the necessity of curing the condition. I do not think Dr. Fothergill really holds strong views to the contrary: I have too high a regard for his opinion and experience.

What we want, Sir, are facts and figures, not nebulous mental impressions. This is very evident when one peruses the long mystic letter of Mr. R. H. Paramore. He is subversive without being destructive. He uses strange and obscure phrases, such as: "But this pelvic floor is for him (W. B. B.) apparently a visceral structure." I confess I may be wrong in my conception of the meaning of this statement. If Mr. Paramore intends to imply that I consider the musculature of the utero-sacral and utero-pubic "ligaments" visceral he is right in so far as the uterus is a viscus, and these muscle-bundles, like the muscle-fibres in the round "ligaments," are morphologically continuous with the external coat of the uterus. But, earlier in this letter, he states: "(W. B. B.) pays no attention to the musculature occluding the outlet; and in his surgical treatment limits himself for the most part to visceral structures, as though this musculature did not exist and is not concerned with the genesis of prolapse."

I mentioned—as Mr. Paramore recognises—that I could not in one lecture discuss every aspect of the subject, adding, "but it goes without saying that much can be accomplished in the way of prophylaxis, and that all surgical procedures are based on a correct appreciation of the normal anatomical conditions and on the lesions present in prolapse." By prophylaxis was meant, as any one should know, not only the non-operative and operative treatment of puerperal retroflexion, but also the careful conduct of labour.

If Mr. Paramore will turn to p. 42, et seq., of the third edition of my "Principles of Gynæcology," he will find I have taken some trouble to describe—briefly, and I hope intelligibly—the musculature of the pelvic outlet; and, if he will glance at the section on operative procedures, he will observe how much I *am* concerned with the musculature, without, I hope, being tedious. Moreover, it will please Mr. Paramore to find, in the appropriate section, such headings as "The acquired form of *hernial* prolapse" and "Other *herniæ* of the uterus" (italics here to indicate the important word), and so on *ad nauseam*, as Dr. Fothergill would say.

I think, Sir, the time has come when we should be glad to have Mr. Paramore's methods and figures in regard to the no doubt very large number of cases of prolapse on which he has operated. I imagine, from the way he writes, that they are far superior to my own or those of anyone else. Once a student always a student, I shall, therefore, be only too willing to learn from anyone how to reach "the zenith," and how better to cure prolapse than by the methods I practise; but I beg Mr. Paramore, or whoever my mentor is to be, in order to save time, to select for the demonstration a case of "congenital" procidentia, not to use paraffin to increase the "viscosity of the visceral parts concerned"—another strange phrase of Mr. Paramore—and to let me see the result 18 months after the "wave of the hand," or whatever the procedure may be. I shall be glad to return the compliment at any convenient time.

I am, Sir, yours faithfully,

Liverpool, May 31st, 1920. W. BLAIR BELL.

PS.—I do not think Mr. Paramore need be anxious about his interposition case that had a fibroid in the uterus. Any competent surgeon who, in the event of further trouble, has to deal with the matter will thank him for making the uterus so accessible.

To the Editor of THE LANCET.

SIR,—Prolapsus uteri is nothing but a hernia, and therefore subject to the rule which applies to the treatment of hernia wherever it occurs—namely, the proper closure of the aperture or ring through which the intra-abdominal structures protrude by an adequate reconstruction of the impaired parietal wall or surface. How to do this effectually has exercised the mind of every gynæcologist. Plastic operations, however carefully and extensively performed, fail in a fair proportion of cases to prevent visceral extrusion, and especially the recurrence of the cystocele; hence the advent of the interposition operation. I agree with Dr. Blair Bell that the latter gives excellent results, impaired by the fact that sepsis, due to defective sterilisation of the uterine and cervical mucous surfaces, sometimes complicates convalescence. But the interposition operation is at the best a makeshift. The correct way to stop a hole in a wall is not by shoving a plug through the aperture. I have seen women, some operated upon by others, some by myself, where the "bouchon utérin," as the French call it, protruded behind an overstretched perineum.

I believe that the only effective way to treat procidentia uteri is a reconstruction of the whole of the pelvic floor from above downwards, including the peritoneum, the subjacent mass of fibro-muscular and adipose tissue forming the base of the broad ligaments, the muscular and fibrous slings underlying these, and, finally, the vaginal outlet, together with the skin covering the perineum. Dr. Blair Bell has attempted this by bringing together intra-peritoneally the utero-sacral ligaments, obliterating Douglas's pouch, slinging upwards the whole visceral pelvic floor, limiting its downward distensibility and declivity, the whole combined with plastic operations. Hence his large percentage of successes. But the same results can be obtained without opening the abdomen. The operation is not as elegant and easy as if done by laparotomy, but it is equally successful. It simply consists in extending the colpo-perineorrhaphy right up to Douglas's pouch, opening the latter, and then by means of a curved needle with silk ligature bringing together the two utero-sacral ligaments, as well as the base of the broad ligaments, thus obliterating Douglas's pouch from below. This operation is no new thing; it was described long ago in America as the correct way of treating uterine deviations. It corrects these, while at the same time it arrests any tendency to descend. In severe procidentia, especially that occurring after the menopause, it is advisable to sacrifice the uterus. The operation is then still easier; not only the utero-sacral ligaments but the whole of the base of the broad ligaments are sewn up in one firm bunch. This, coupled with a myorrhaphy of the levator ani and an extensive anterior and posterior colpo-perineorrhaphy, invariably gives good results, even in the worst cases.

I am, Sir, yours faithfully,

G. A. CASALIS DE PURY,
Late Consulting Gynæcologist to the Victoria Hospital, Winburg, Cape.

Wimpole-street, W.

SINCERE FLATTERY.

To the Editor of THE LANCET.

SIR,—The Executive Council of the Federation of Medical and Allied Societies recently invited the Council of the British Medical Association to reopen the conferences held between various medical bodies in the summer of 1919. The organisations which took part in those conferences were the British Medical Association, the Federation of Medical and Allied Societies (then the Medical Parliamentary Committee), the Medical Women's Federation, the Medico-Political Union, and the Association of Panel Committees. At the final conference it was agreed "that the members of the conference should report the findings to their constituent bodies, and that the calling of a further conference should depend on the attitude taken by those bodies."

In accordance with the terms of this agreement, and after ascertaining that four of the five bodies concerned desired it, my Executive Council wrote to the British Medical Association on March 23rd, 1920, and the following reply, dated May 28th, 1920, has been received:—

British Medical Association, 429, Strand, W.C. 2.

DEAR SIR,—Your letter of March 23rd was placed before the Council of the Association at its meeting on the 19th inst., when I was instructed to say that the Council sees no useful purpose in reopening the former conferences. The Council is recommending to the Representative Body the widening of the constitution of the Association so as to allow it to offer federation or affiliation to medical bodies which care to enter into such relations with the Association. If these recommendations are accepted by the Representative Body it is proposed later in the year to hold conferences with medical societies representing sectional interests, with a view to determining how best to carry these proposals for affiliation or federation into effect. Yours faithfully,

(Sd.) ALFRED COX, Medical Secretary.

It would appear that the Council of the Association has in contemplation the possibility of reconstructing itself on the lines of this Federation.

I am, Sir, yours faithfully,

N. HOWARD MUMMERY,

General Secretary, Federation of Medical and Allied Societies.
5, Vere-street, Cavendish-square, W., May 31st, 1920.

*** We continue to hope that the British Medical Association will find a way to coöperate with the Federation of Medical and Allied Societies in the common object of unifying the aims of medicine and the public for useful legislation in the future.—ED. L.

Medical News.

UNIVERSITY OF LONDON.—At examinations held recently the following candidates were successful:—

THIRD (M.B., B.S.) EXAMINATION FOR MEDICAL DEGREES.

Iskander Mikhail Abd-El-Said, Univ. Coll. Hosp.; Basil William Armstrong, St. Mary's Hosp.; Eric Miles Atkinson, St. Bart.'s Hosp.; Marjorie Back, London Sch. of Med. for Women; Christian Frederick Beyers, St. Bart.'s Hosp.; John Anthony Birrell, Cardiff and Bristol Univs. and St. George's Hosp.; William Roy Blore, Manchester Univ.; Thomas George Doughty Bonar, Guy's Hosp.; Ella Marianne Britten, St. George's Hosp.; William Wallace King Brown, Ernest Edwin Carter, and Duncan Gillard Churcher, St. Thomas's Hosp.; Walter Herbert Coldwell, Westminster Hosp.; Hedley Chave Cox and Ralph Coyte, St. Bart.'s Hosp.; Joyce Emily Craggs, St. Mary's Hosp.; Ernest Ivon Davies, Charing Cross Hosp.; Sarah Helen Davies, London Sch. of Med. for Women; Harold Aylmer De Morgan, Middlesex Hosp.; Geoffrey Barrow Dowling (honours, distinction in Medicine), Guy's Hosp.; Charles Yarrow Eccles, St. Thomas's Hosp.; Albert Eidinow, London Hosp.; George Ernest Elkington (honours, distinction in Pathology), Birmingham Univ.; Thomas Leslie Ellis, St. George's Hosp.; Abel Evans, Charing Cross Hosp.; James Fanning, London Hosp.; Kathleen Field, St. Mary's Hosp.; Alice Muriel Griffiths, London Sch. of Med. for Women and Univ. Coll., Cardiff; Ernest Frederick Guy, Univ. Coll., Cardiff, and Univ. Coll. Hosp.; Henry Lewis Heimann, Univ. Coll. Hosp.; Cecil Edward Eede Herington, Christopher Langton Hewer, and Norman Hammond Hill, St. Bart.'s Hosp.; George Philip Buckingham Huddy (honours, distinction in Surgery), London Hosp.; Graydon Oscar Hume, Guy's Hosp.; Donald Hunter, London Hosp.; Ernest Francis Kerby and George Edwin Kidman, Guy's Hosp.; Joseph Victor Landau, St. Bart.'s Hosp.; Sidney Simon Lindsay and Norman Peace Lacy Lumb, St. Thomas's Hosp.; Hugh Montagu Cameron Macaulay, St. Bart.'s Hosp.; Peter George McEvedy, Guy's Hosp.; Syed Francis Mahmood, St. Bart.'s Hosp.; Ida Caroline Mann, London Sch. of Med. for Women and St. Mary's Hosp.; Maurice Marcus (honours, distinction in Forensic Medicine and Surgery), London Hosp.; Jal Pestonji Padshah, Univ. Coll. Hosp.; Dorothy Pantin, London Sch. of Med. for Women; Wilfrid Walter Payne, Guy's Hosp.; Norman August Marais Peterson, London Hosp.; Norah Dorothy Pinkerton, London Sch. of Med. for Women; Beatrice Davidine Pullinger, London Sch. of Med. for Women and St. Mary's Hosp.; Arthur Leslie Hanworth Rackham, Middlesex Hosp.; Henry Elliott Reburn, King's Coll. Hosp.; Frances Elinor Rendel, London Sch. of Med. for Women and St. Mary's Hosp.; Esther Rickards, St. Mary's Hosp.; Henry Colwell Rook, Guy's Hosp.; James Paterson Ross (honours, distinction in Forensic Medicine and Surgery, University medal), St. Bart.'s Hosp.; Trevor Cecil Russell, St. Mary's Hosp.; Edward Jeffrey Samuel, Charing Cross Hospital; Philip Dennis Scott, Guy's Hosp.; James Victor Alexander Simpson, Middlesex Hosp.; Gerald Maurice Joseph Slot (honours, distinction in Medicine), St. Bart.'s Hosp.; Joseph Bulmer Thackeray, London Hosp.; Jeremias Auret van Heerden, St. Bart.'s Hosp.; Alfred Stewart Wakely, King's Coll. Hosp.; Robert Lawrence Walker, St. Mary's Hosp.; Morris John Theodore Wallis, Guy's Hosp.; Leslie Herbert Worthy Williams, Univ. Coll. Hosp.; Frederick Edward Saxby Willis, St. Bart.'s Hosp.; Jane Edith Wood, Leeds Univ.; and William Yeoman, Univ. Coll. Hosp.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates passed in the subjects indicated:—

Surgery.—G. S. Ashby (Sect. II.), King's Coll. Hosp.; J. G. Barrie (Sects. I. and II.), Guy's Hosp.; M. L. Barst (Sect. I.), London Hosp.; C. C. Bennett (Sect. II.) and W. H. Cellier (Sect. II.), Guy's Hosp.; M. J. Erdberg (Sects. I. and II.), Durham; A. Keilin (Sects. I. and II.), Paris and Charing Cross Hosp.; J. Kendall (Sects. I. and II.), Guy's Hosp.; W. A. O'Connor (Sect. I.), Oxford and Birmingham; W. H. Summerskill (Sect. I.), Guy's Hosp.; and G. V. L. Van Acker (Sects. I. and II.), Oxford and Birmingham.

Medicine.—L. Burvill Holmes (Sects. I. and II.), Guy's Hosp.; A. R. Crane (Sects. I. and II.), London Hosp.; M. J. Erdberg (Sects. I. and II.), Durham; A. G. B. Fenwick (Sect. II.), St. Thomas's Hosp.; and A. Furniss (Sect. II.), Manchester.

Forensic Medicine.—L. Burvill Holmes, Guy's Hosp.; M. J. Erdberg, Durham; and H. D. L. Jones, St. Mary's Hosp.

Midwifery.—M. J. Erdberg, Durham; P. N. Gray, King's Coll. and Westminster Hosps.; and G. V. L. Van Acker, Oxford and Birmingham.

The Diploma of the Society was granted to the following candidates entitling them to practise medicine, surgery, and midwifery: G. S. Ashby, J. G. Barrie, C. C. Bennett, M. J. Erdberg, A. G. B. Fenwick, A. Furniss, A. Keilin, and J. Kendall.

UNIVERSITY OF CAMBRIDGE.—The State Medicine Syndicate recommend that a University Lectureship in Medical Radiology and Electrology should be instituted for a period of five years from June 1st, 1920.

UNITED SERVICES MEDICAL SOCIETY.—A general meeting of this society was held at the Royal Army Medical College on May 28th, when it was resolved that the society should amalgamate with the War Section of the Royal Society of Medicine on the condition that its members were accepted without entrance fee to the section, but subject to an annual fee of one guinea. The society decided to hand over to the Royal Society of Medicine the balance of cash as shown on the books on Jan. 1st, 1915, the remainder to be divided amongst the subscribers to the society since that date. To permit of this adjustment it is requested that the subscribers in question will forward their present addresses to Major E. M. Middleton, the secretary of the United Services Medical Society, at the Royal Army Medical College, Grosvenor-road, S.W.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—An ordinary meeting of this society will be held to-day, Friday, at 8.30 P.M., in the society's rooms, West London Hospital, Dr. Herbert Chambers, the President, in the chair. A paper will be read by Dr. Ernest Snowden, entitled "A Short Method of Psychological Analysis."

The Cavendish lecture will be given by Professor C. S. Sherrington, on "Posture," and a conversazione will be held at the Kensington Town Hall on Friday, June 25th. Members desiring tickets for guests are requested to communicate at once with the senior honorary secretary, Dr. J. F. Halls Dally, 93, Harley-street, London, W. 1.

FLECHSIG'S JUBILEE.—On May 23rd the well-known Leipzig anatomist and psychiatrist, Paul Flechsig, celebrated the fiftieth anniversary of his graduation. Born at Zwickau in 1847, he attended the gymnasium there, going on to study medicine in Leipzig. When assistant at the University Physiological Institute his first considerable work on Conduction Paths in the Brain and Spinal Cord attracted the attention of his master Ludwig, whose influence with that of Kussmaul and Meynert brought Flechsig within two years of his graduation to the rank of professor. In 1882 he took over the Neurological Clinic, built and furnished on plans drawn up by himself, whose chief he still is. Flechsig holds an honorary doctorate in the Faculty of Exact Sciences at Oxford, and is an honorary member of learned societies in Dorpat, Dresden, Florence, Kieff, London, Munich, Paris, Petrograd, Rome, and Vienna. On the day of his jubilee the firm of Georg Thieme, of Leipzig, issued as a Festschrift the first volume of a monumental work on the Anatomy of the Human Brain and Spinal Cord on a Myelogenetic Basis, on which the veteran psychiatrist has been intensively engaged for ten years.

A RECENT **flag day held by the League of the** Roses, Miss M. F. Roby chairman, realised £326 18s. 5d. for the Great Northern Central Hospital.

Sir Robert Borden, the Prime Minister of the Canadian Parliament, has written to Mr. Rockefeller expressing the appreciation of the Canadian people for his gift of $5,000,000 to Canadian medical education.

THE first annual conference of the subassistant surgeons of Madras Presidency was held recently at the Madras Medical College, Major-General Giffard, Surgeon-General with the Madras Government, presiding. About 200 subassistant surgeons from the city attended.

Dr. John O'Conor, senior medical officer of the British Hospital, Buenos Ayres, has been appointed a Knight Commander of the Most Excellent Order of the British Empire for services in connexion with the war.

INDIAN MEDICAL SERVICE DINNER.—**The annual** dinner of the Indian Medical Service will be held at the Trocadero on Tuesday, June 8th, at 7.45 P.M., Major-General G. F. A. Harris, C.S.I., in the chair. Tickets and all particulars may be obtained from the joint honorary secretary, Colonel J. J. Pratt, I.M.S. (retired), 63, Addison-road, London, W. 14.

THE Board of Governors of the American Hospital in London are giving a dinner at Claridge's Hotel on July 6th, at which the guest of the evening will be Dr. Charles W. Mayo, of Rochester, U.S.A. The American Ambassador, Lord Bryce, and Lord Reading are associated with the hosts of the dinner, and Mr. Philip Franklin, 27, Wimpole-street, W., is acting as honorary secretary.

Dr. Addison has appointed Mr. Llewelyn Williams, M.C., to be Medical Member of the Welsh Board of Health with the status of a Senior Medical Officer of the Ministry of Health. Dr. Meredith Richards, who has been acting temporarily as medical member of the Welsh Board of Health, has been appointed to the headquarters establishment of the Ministry of Health.

IMPERIAL WAR MUSEUM AND GREAT VICTORY EXHIBITION.—The opening ceremony of the above exhibition will be held at the Crystal Palace on Wednesday, June 9th, at 11.15 A.M., when the King will preside. We learn that the war exhibits are of a most interesting and varied character, and should occupy the visitor's attention for some time. Medical men will be attracted, amongst other sections, to the Naval Medical Section, organised by Surgeon-Commander M. H. Knapp, R.N. Altogether the exhibition promises to be a great national event.

A LIST OF SPECIAL SCHOOLS.—**The Board of** Education has just issued a list of special schools for blind, deaf, and defective children in England and Wales, with a note as to the amount of accommodation and average attendance. As this list is intended solely for official use the schools are entered under the county in which they are situated without an indication of the authority responsible for them. It appears that in England 39 day and 19 residential schools are provided for the blind, 29 day and 20 residential for the deaf, 171 day and 20 residential for the mentally defective. Schools for tuberculous and non-tuberculous children are classified together. It is interesting to note that London contains more than one-third of the day schools for blind, deaf, and physically defective children.

A HOLIDAY COURSE IN TUBERCULOSIS.—**A holiday** course, under the auspices of the Assistance Publique of Paris, will be held from July 19th to 31st, each day at 2 P.M., at the Maritime Hospital at Berck-sur-Mer (Pas-de-Calais). It will consist of 12 lessons on osteo-articular and ganglionic tuberculosis and some elements of practical orthopædics by the following medical men: M. Menard, honorary chief surgeon of the Maritime Hospital; M. Sorrel, chief surgeon; MM. Andrieu and Tridon, assistant surgeons; M. Mozer, chief of the hospital laboratory; M. Parin, chief of the laboratory of radiology of the hospital. The course will comprise the elements of diagnosis furnished by the laboratory and radiology, Pott's disease, coxalgia, tuberculosis of the knee and tarsus, tuberculosis of the shoulder, elbow, and wrist, tuberculous osteitis, non-tuberculous osteitis and chronic osteo-arthritis with their clinical and laboratory diagnoses, chronic adenitis, helio-marine, radiotherapeutic and surgical treatment, rickets and its treatment, deformities and osteo-articular troubles of adolescence, scoliosis and its treatment. The mornings will be devoted to practical demonstrations as follow: Clinical examinations on Mondays, operations and punctures on Tuesdays and Fridays, plasters Wednesdays and Saturdays, laboratory demonstrations Thursdays. The fee for the course is 150 francs (Internes of the Paris hospitals are exempt). Enrolment should be made by letter addressed to Dr. Parin, Hôpital Maritime, Berck-Plage (Pas-de-Calais), France.

EAST SUSSEX HOSPITAL.—**The governors of the** East Sussex Hospital at Hastings have elected Dr. H. Stanley, Mr. J. W. M. King, and Mr. H. Groome as the first honorary life governors in recognition of valuable work in the interests of the institution.

ROYAL DEVON AND EXETER HOSPITAL.—**As a result** of the appeal for £20,000 for the extension of the Royal Devon and Exeter Hospital the sum of £12,622 has been received, and it is hoped that the remaining amount will be shortly subscribed.

DEVON AND CORNWALL EAR AND THROAT HOSPITAL, PLYMOUTH.—At the annual meeting of the subscribers to this institution held on May 28th it was reported 1014 patients had been treated compared with 760 in 1918. The financial statement showed a deficit of £100. The chairman, the mayor, alluded with regret to the retirement of Mr. C. E. Bean, who had been honorary surgeon to the hospital since its foundation 33 years ago, and paid a tribute to the value of his services.

THE LATE MR. W. EAGER.—**Wilson Eager,** L.R.C.P., M.R.C.S., L.S.A., died at his residence, Woodbridge, Suffolk, in his seventy-sixth year. The deceased was a son of the late Mr. R. Eager, a surgeon, of Guildford. He was for 27 years medical superintendent of the Suffolk County Asylum, Melton, now known as St. Audry's Mental Hospital. He resigned in 1897, and joined his elder brother at Northwoods Private Asylum, near Bristol; ten years later he retired from active work, and went to live at Woodbridge, Suffolk, where he was highly esteemed. His son, Dr. Richard Eager, is deputy medical superintendent of the Devon Mental Hospital.

BRITISH WATERWORKS ASSOCIATION.—**The ninth** annual general meeting of this association will be held in the Council Chamber, The Exchange, Nottingham, on Thursday, July 1st. The proceedings include the reading and discussion of interesting papers on water undertakings from both the economic and hygienic point of view, and the members of the association and their friends are invited to visit the filtration plant and pumping stations belonging to the Nottingham corporation. The sources of water-supply in Nottingham are manifold, including the moorland area of the Derwent Valley, the deep wells in sandstone at Bestwood and Boughton, and the artesian boreholes at Burton Joyce. The meeting altogether promises very interesting proceedings.

MATERNITY HOME FOR SAILORS' WIVES.—The Central Commtitee of the Navy League has given £30,000 for the establishment of maternity homes for the wives of sailors and Marines at each of the three principal naval ports—Portsmouth, Devonport, and Chatham—£10,000 for each port. In 1917 the women of Canada collected a handsome sum as an expression of their admiration for the British Navy. Of that money £3000 were handed over to the Commander-in-Chief at Portsmouth for maternity purposes. A meeting to inaugurate a scheme for its application was held in the Town Hall, Portsmouth on May 26th, when it was stated that a suitable house in Southsea had been purchased for £4000 and was being equipped as a maternity home. The plans have now received the official approval of the Ministry of Health. The institution of the home has the support of all ranks and ratings in the navy.

TUBERCULOSIS IN ABERDEENSHIRE.—**Dr. H. J. Rae,** the tuberculosis officer for the county of Aberdeen, has completed his fourth annual report. He states that the tuberculosis death-rate for the county of Aberdeen during 1919 was the lowest for six years, the number of cases notified being 342; 242 of these were pulmonary and 100 non-pulmonary or surgical tuberculosis. 248 were notified in the districts and 94 in the burghs—that is, 2·1 per 1000 in the former and 2·3 per 1000 in the latter case. Of the cases notified, 180 were males and 162 females. During the year in the county of Aberdeen 50 soldiers and sailors received treatment in institutions, 78 were treated either at their homes or at the dispensary, and 12 had the use of shelters. The sources of notification were: from general practitioners, 267; from military and naval medical officers, 45; from medical officers of medical and surgical hospitals, 9; from medical officers of health of other areas ("transfers"), 8; from medical officers of asylums, 8; from school medical officers, 3; from tuberculosis medical officers, 2. The report again calls attention to the large number of "box-beds" still in existence, although they are less common than they formerly were, and also to the surprising number of tuberculous persons who, without the knowledge of their doctor, try and use quack medicines, paying perhaps 24s. for a bottle the contents of which would probably only cost 9d. It is the poorer class of patient who purchase those supposed remedies, and in many cases they stint themselves of the necessaries of life in order to secure a phantom cure. Dr. Rae urges that the composition of those quack remedies should be exposed, and, if possible, their sale prohibited.

THE University of Alberta is preparing to make extensive additions to its buildings and amenities, according to a local correspondent. An estimate of requisitions has been made amounting to $750,000, to be employed in furnishing more class-room and laboratory accommodation, which is urgently needed. Although the University is a comparatively new one, the registration of medical students for the present term has reached 180, of whom 72 constitute the freshman class.

MEDICAL GOLF CHAMPIONSHIP.—The 1920 Medical Golfing Society Tournament will be held on Thursday, June 24th, at Northwood, Middlesex, by kind permission of the Northwood Golf Club. The Medical Golf Championship Cup, presented by THE LANCET in 1914, will be held by the player on the Medical Register who makes the best scratch return v. Bogey; this competition is a regular feature at the annual meeting of the Medical Golfing Society. Anyone on the Medical or Dental Register can join the society by payment of the annual subscription (5s.), which includes entrance to the tournament. Full particulars of the tournament, with form of entry, can be obtained from L. Eliot Creasy, hon. secretary and treasurer, 36, Weymouth-street, London, W.1 (T. 904, Paddington).

A ONE-SEATER FOR THE DISABLED.—A demonstration of motor-cycles and other vehicles adapted for the use of disabled persons is to be held on June 12th in the Inner Circle, Regent's Park, London, N.W. One of the designs is described as consisting of a side-car body on four wheels, driven by electricity and made in different varieties, controllable entirely by hand, entirely by foot, or by both, to suit the special case. It is said to be capable of running for 35 miles without re-charging at a maximum speed of 15 miles per hour, while the cost of a full battery charge is only 2s. If the price is not prohibitive this machine should prove popular among the disabled, as it is stated to be light in weight and simple to run.

ULSTER MEDICAL SOCIETY.—At the annual meeting of this society, held on May 27th at the Medical Institute, Belfast, with Mr. Andrew Fullerton, the President, in the chair, a report was submitted showing that, beside the honorary Fellows, there was an increase in ordinary Fellows and Members, the total Fellows being 123 and Members 87—210 in all. Financially there was a deficit, and a special committee was appointed to look into the matter after various suggestions—such as efforts to get more doctors to join the society, an increase of subscription, or a decrease of expenditure—had been brought forward. The following office-bearers for session 1920–21 were elected:—

President: Dr. Thomas Houston. Ex-President: Mr. Andrew Fullerton. Vice-Presidents: Dr. Samuel Agnew (Lurgan) and Dr. J. E. MacIlwaine. Honorary Treasurer: Dr. S. I. Turkington. Honorary Secretary: Dr. W. W. D. Thomson. Honorary Librarian: Dr. W. L. Storey. Honorary Editorial Secretary: Dr. R. Marshall. Council: Dr. C. G. Lowry, Mr. Howard Stevenson, Dr. S. T. Irwin, Dr. V. G. L. Fielden, Mr. W. Burns, and Dr. Boyd Campbell.

INCREASE OF PROSTITUTION AND VENEREAL DISEASES IN VIENNA.—Our Vienna correspondent writes: An energetic but apparently futile fight is being organised against one of the chief menaces to public health—the increase of prostitution, as manifested by the results of the frequent raids of the police on certain hotels and inns. The war caused in all large cities a severe relaxation of sexual morals, but nowhere in such a degree as in Vienna. The general financial collapse tends to make things worse still, as poverty is very often the cause of the first stumbling from the road of respectability, which soon is followed by a true downfall. The subject was not considered a fit one for public discussion until a few years ago, but the great danger involved in the extension of venereal disease has necessitated its ventilation; a hopeful battle cannot be fought without information and explanation to the masses. The daily press brings alarming numbers and facts, which relate to all classes of the population. Whilst formerly the chief sources of secret or open prostitutes were servant girls out of work, waitresses, or factory girls, now a large percentage are recruited from clerks, typists, daughters of respectable families, or even wives of the poorly-paid clerks or civil servants. In 1919 over 7000 females, of whom 2700 were diseased, were arrested for "illegal" prostitution. 2400 were dealt with by a special department of the Board of Health; 800 of these were between 18 and 21 years of age, and 42 per cent. were diseased. 1392 were under 18 years old, with 50 per cent. infected. In the first quarter of 1920 the same Board examined 800 cases, with 40 per cent. disease; 90 girls were between 14 and 18 years old, with 60 per cent. of disease. These figures show that the increase of venereal disease is a real danger and cannot be dealt with except by up-to-date measures. It is futile to search for the infected girls in the inns and hostelries, and lock them up or bring them for compulsory treatment to hospitals, whilst the men are left alone. The necessity of coercive measures against men found infected on such occasions is becoming more and more appreciated. The sanitary police service in Austria is demanding a new law, by which it would have power to subject to effective medical treatment all persons found ill from sexual disease and behaving in a way that favours transmission of the illness. Naturally such a law would mean severe restriction of individual liberty, but it appears to be the only policy to adopt. The transmission of disease by infected men is at least as dangerous, and as likely, as by women, and must be treated on the same principles as, for instance, cases of scarlet fever or diphtheria, which are at once made innocuous by separation and hospitalisation. The new regulations will be issued shortly.

MEDICAL MAGISTRATE.—Mr. Charles Edwards has been placed on the commission of the peace for the borough of Bridport (Dorset).

PRESENTATION TO A MEDICAL MAN.—Dr. Arthur Napper, of Cranleigh, Surrey, was last week presented with an armchair and a cheque for £750 on his retirement after 46 years of public life.

FLORENCE NIGHTINGALE MEDAL.—This medal was instituted by the International Red Cross Committee in 1912 in memory of the work of Miss Florence Nightingale, to be distributed annually to six trained nurses who, in the opinion of the Committee, have rendered exceptional service in connexion with nursing. During the war no distribution was made, but shortly after the signing of Peace it was decided to award 50 of these medals, and all National Red Cross Societies were requested to submit recommendations for consideration by the Committee. Forty-two medals have been awarded and amongst the recipients are included the following, whose names were submitted by the British Red Cross Society:—

Mrs. John Lambert, of the Royal Naval Nursing Reserve, for services in 1915 and 1916, especially on the Hospital Ship *Rewa* at Gallipoli.

Miss Beatrice Isabel Jones, R.R.C., C.B.E., Matron Q.A.I.M.N.S. for services in Mesopotamia since 1916.

Miss Gladys Laura White (Sister), B.R.C.S., for service 1915 to 1918, especially at No. 9 B.R.C.S. Hospital at St. Omer (No. 36 Casualty Clearing Station).

Miss Kate Maxey, R.R.C., M.M., Sister T.F. Nursing Service, for services from 1914 to 1918, especially at No. 58 Casualty Clearing Station.

Miss Gertrude Mary Wilton Smith, Q.A.I.M.N.S., for services as Sister-in-Charge of Anglo-French Hospital Train No. 7 and No. 3 Casualty Clearing Station, France.

Miss Margaret Clotilde Macdonald, R.R.C., Matron-in-Chief of the Canadian Army Nursing Service.

Miss Lucy Minchin, Nursing Sister of the British Army in India and Mesopotamia.

Miss Hester Maclean, R.R.C., Matron-in-Chief, New Zealand Army Nursing Service.

Mrs. E. R. Creagh, O.B.E., R.R.C., Matron-in-Chief, South African Military Nursing Service.

THE LATE DR. R. EDWARDS.—The death has occurred at Carlisle of Dr. Robert Edwards, following influenza and pneumonia. Dr. Edwards graduated at Edinburgh University in 1907, and his first appointment was that of house surgeon at the Cumberland Infirmary at Carlisle. Here he remained a year, and then became successively a house surgeon at the Great Ormond-street Hospital for Sick Children, London, and a resident surgeon at the Royal Sea-Bathing Hospital at Margate. Seven or eight years ago he began to practise at Carlisle, where he soon became popular. Soon after the war began he became acting assistant surgeon at the Cumberland Infirmary, where he had previously been placed in charge of the X ray and electrical departments. He then joined the army and went abroad, but was sent back to England owing to ill-health, and for some time served under Sir Robert Jones at the Orthopædic Hospital at Liverpool. When later he returned to Carlisle he was appointed surgeon, with the rank of major, at the Fusehill Military Hospital, and gradually resumed his private practice. Dr. Edwards had attained considerable skill as a surgeon, and was specially noted for his abdominal work. During and since the war he had specialised more particularly in orthopædic surgery. At the Gretna railway disaster in 1915 Dr. Edwards rendered invaluable service, repeatedly inserting himself under burning coaches to liberate and attend to the injured, in spite of cries of warning from the railway officials, who expected a gas explosion any minute. In order to release two soldiers pinned beneath a coach and in danger of being burnt alive he amputated both legs of one man and one leg of the other. He thus saved the life of one of them, the other dying from shock. When Dr. Edwards himself arrived at the Cumberland Infirmary his coat had been burnt off his back. The news of his death at the early age of 35 has been received with great regret, and much sympathy is felt with the widow and two young children who survive him.

The Services.

THE HONOURS LIST.

THE following appointments to the Most Excellent Order of the British Empire, for services in connexion with the war, are announced:—

K.B.E.—Dr. John O'Conor, Head of the British Hospital in Buenos Ayres.

O.B.E.—Mrs. Constance Muriel Astley Meyer, Civil Surgeon, attached R.A.M.C.

M.B.E.—Dr. Herman Arthur Macdonald, Medical Officer, Alverstoke Auxiliary Hospital, Hampshire.

ROYAL ARMY MEDICAL CORPS.

Major E. V. Aylen relinquishes the temporary rank of Lieutenant-Colonel.

Temp. Major J. J. Abraham relinquishes the acting rank of Lieutenant-Colonel.

Temp. Capt. A. Brown to be acting Lieutenant-Colonel.

Capt. A. S. Cane to be temporary Major whilst specially employed.

The undermentioned relinquish the acting rank of Major: Capts. A. T. J. McCreery (Bt. Major), C. D. K. Seaver, H. G. Trayer, Temp. Capts. H. B. Graham, W. T. Currie, A. G. Gilchrist, R. Massie, A. C. S. Courts, J. H. Peek.

Capt. T. J. Hallinan is seconded for service under the Civil Administration of Mesopotamia.

Lieutenants (temporary Captains) to be Captains: W. M. Cameron, A. G. Harsant, M. StC. Hamilton, A. Rodd.

J. S. F. J. Kerr to be temporary Lieutenant.

Officers relinquishing their commissions:—

Captains granted the rank of Lieutenant-Colonel: C. J. A. Griffin, C. N. Gover, D. C. Barron, E. M. Cowell, G. T. van der Vijver, T. Y. Barkley, A. T. Pitts.

Captains, granted the rank of Major: F. Cook, C. E. H. Gater, G. Dalziel, J. Purdie, A. Glen, W. Barclay, W. C. B. Meyer, O. H. Mavor, M. W. Paterson, C. J. B. Way, B. Goldsmith, C. Nicholson, S. Wickenden, C. Lovell, A. B. Mitchell, J. R. McCurdie, R. L. Newell, K. K. Drury, D. Dougal, A. J. Gilchrist, T. F. Corkhill, V. Wiley, E. Watson-Williams, W. J. Adie, W. Johnson, M. J. B. F. Burke-Kennedy, G. G. Marshall, G. Marshall, J. B. Scott, E. R. Lovell, W. R. Blore, A. L. Shearwood, G. R. Bruce, J. H. Beverland, D. S. Badenoch, A. Wilson, H. R. Friedlander, G. G. Alderson, J. C. Spence, J. Paulley, R. P. Ballard, K. W. Lewis, W. McCombie, W. B. Cathcart, H. G. Crawford, W. B. Postlethwaite, R. P. A. Kirkland, E. C. W. Starling, G. T. Mullally, (Bt. Maj.) R. C. Ozanne, P. J. Gaffikin, A. A. Smalley, T. G. Fleming, J. Swan, E. J. Bradley, W. Murdock, W. B. Foley, J. B. Cavenagh, E. A. Mills, D. G. Stoute, F. Gamm, D. Colombos, A. R. Hill, J. B. Hanna, H. W. H. Holmes, J. A. Stewart, D. McIntyre.

Captains retaining the rank of Captain: C. G. Schurr, H. E. Creswell, H. K. V. Soltau, R. P. S. Mason, W. C. Mackie W. Broughton-Alcock, J. W. McNee, H. E. B. White, J. S. Dockrill, J. L. Perceval, E. S. Mawe, C. McL. West, D. J. Steele, S. D. Lodge, J. J. D. La Touche, F. H. Goss, G. S. Trower, G. C. L. Woodroffe, J. L. Kilbride, J. C. Young, S. K. Young, R. C. B. Ramsay, J. A. W. Cullen, F. L. P. G. Bennett, J. H. Owen, M. J. Graham, F. A. Belam, J. J. B. Edmond, D. M. M. Fraser, D. C. L. Vey, A. Smith, E. A. Dyson, H. A. Fawcett, S. W. Rintoul, H. B. Goulding, A. McM. Paterson, N. A. Martin, F. G. Lescher, E. K. Ryan, H. M. Pope, W. T. Quinlan, H. W. Evans, H. S. Pemberton, J. Le M. Kneebone, J. K. R. Landells, R. O. Eades, W. S. Birch, A. E. H. Reid, A. J. Ewing, R. N. O. Moynan, J. V. L. Grant, T. M. Miller, M. Avent, B. Greillier, C. H. Attenborough, H. J. S. Morton, E. S. Walls, J. P. Mitchell, J. P. Davies, S. W. M. Jones, G. N. Smyth, R. S. Woods, F. A. Bearn, J. W. Craw, G. W. Wood, J. P. Stallard, T. F. Hegarty, B. Murphy, P. W. Ransom, W. S. Haydock, F. R. Kerr, C. Jacobs, G. A. Hodgson, P. Thornton, J. E. Allan, J. Cowan, G. L. Jones, F. Sykes, L. H. W. Williams, W. H. Shephard, F. V. Bevan-Brown, O. D. Child, H. Smith, J. A. Ryle, C. F. Hacker, J. K. J. Haworth, L. H. W. Iredale, G. M. Roberts, J. S. Robinson, G. D. Read, W. A. MacLennan, G. H. C. Mold, J. F. Hill, G. C. Dixon, J. N. McIntosh, G. F. Clifton, E. F. Guy, J. McKerchar, W. A. Elliott, T. B. Heaton, F. H. Kennedy, T. G. Shand, C. Grant, L. A. Lewis, J. S. Pooley, J. Kennedy, C. A. Mason, W. B. Wood, M. McKnight, A. L. Anthony, C. Gamble, H. L. Garson, W. K. Russell, J. H. Stewart, C. C. Waddington, G. W. Watson, W. A. Young, W. W. Phillips, W. M. Dickson, L. B. C. Marksman, T. Sheedy, J. L. McBean, F. M. Barnes, J. G. Bennett, T. P. Inglis, F. C. Lapage, H. M. Williams, F. A. Duffield, F. Sanders, J. W. Wood, G. M. Scott, J. O. Reid, S. W. Lund, P. B. Corbett, J. Lawson, N. B. Graham, R. O. C. Thomson, D. W. J. Andrews, J. G. Hendry, J. S. Armstrong, S. Brown, A. R. Laurie, H. T. Chatfield, A. L. C. Mackenzie, W. W. Blair, T. R. Davies, I. F. Mackenzie, K. P. Brown, H. D. Wright, G. Morris, G. Irving, D. R. Jones, J. N. L. Blamey, C. P. L. Carrier, A. McL. Ferrie, M. Foster, W. N. Greer, I. MacKenzie, J. Milne, C. P. Pemberthy, B. J. Ryrie, J. M. Smellie, W. L. Ingham, C. Rudd, E. W. Fish, H. C. Broadbridge, W. J. Vance, C. W. Dudley, G. S. Davidson, M. Dwyer, G. Lapage, E. B. Alabaster, R. Colley, A. C. Brown, J. W. Dalglish, J. F. Duthie, E. G. S. Hall, A. F. McMillan, R. Rodger, J. B. Steven, R. W. MacDonald, J. A. Buchanan, J. H. Albinson, D. D. Evans, H. S. Moore, R. B. Stewart, R. J. Staley, D. F. Standing, A. H. Craig, G. Ewen, G. J. Key, A. C. MacDonald, A. G. P. Wills, W. O. F. Sinclair, H. J. Wright, G. E. Kidman, J. J. Murphy, E. H. V. Hensley, A. R. Steven, W. A. Malone, A. Johnstone, G. S. Mather, J. Ross, F. B. Macaskie, P. R. E. Kirby, A. C. Dickey, J. P. Bracken, W. Saunderson, T. Wilson, J. D. Dyson, C. E. Bond, J. A. Murray, E. Lipman, D. H. Anthony, J. E. Kitchen, J. B. Hume, W. E. Wilson, T. Crisp, W. Richards, G. K. E. Inman, J. E. Bannen, J. Beveridge, H. D. Brown, W. Donald, T. J. Honeyman, J. MacA. Mackintosh, D. B. Robertson, H. Chadwick, J. Stirling, H. W. Torrance, A. G. Anderson, F. J. C. Johnstone, J. Ratcliffe, J. Sellar, N. N. B. Fleming, R. B. Hawes, C. E. Hopwood, J. R. Banks, J. A. Hill, J. H. Vance, E. Butler, W. Agar, C. Y. Roberts, E. M. L. Morgan, T. P. Williams, P. R. Riggall, G. S. Martin, F. N. Sidebotham, A. R. Balmain, R. F. Jarrett, J. W. G. Steell, R. G. Simpson, T. B. Bailey, L. Cunningham, R. Moser, B. H. Simon, G. S. Lawrence. J. F. C. Braine, G. W. Heckels, E. Newton, S. C. Swinburne, G. S. Wilson, W. Yeoman, G. G. Jack, W. M. Morris, W. B. Lawson, D. Mitchell, H. C. Roberts, F. K. Hayman, G. E. Archer, J. H. E. Annequin, W. C. Craig, G. C. McEwan, R. A. Woodhouse, N. C. L. B. Tweedie, N. S. Tirard, H. Franklin, C. J. Penny, R. W. Lush, L. S. Gathergood, T. L. Heath, F. C. A. Frith, H. D. McIlroy, S. A. T. Ware, A. T. Woodward, E. R. Longstaff, M. C. Joynt, G. A. Harrison, R. Woodside, D. C. Bluett, A. R. Dingley, P. A. Buxton, J. W. Gordon, J. A. Tolmie, A. A. Fitch, J. B. Mudge, H. A. G. Dykes, W. F. Mason, W. G. Verniquet, A. H. Mitchell, F. R. Leblanc, E. A. C. Langton, W. Christopher, R. L. Jones, A. G. Lumsden, V. T. B. Yule, R. Nixon, P. B. Pinkerton, E. Bramley, J. D. Johnson, R. R. Garden, J. Allison, J. L. Hill, J. M. Martin, H. Patlansky, R. B. Smith, W. McElroy, F. W. Hebblethwaite, H. F. Hollis, W. H. Kerr, A. D. C. McGowan, D. W. M. MacKenzie, J. W. Patterson, H. B. Sergeant, F. J. Jack, D. Lennox, S. N. Dykes, A. J. B. Griffin, E. S. Stubbs, H. W. Leatham, C. C. Chesterman, F. O. Taylor, H. W. Featherstone, J. E. Carpenter, P. A. Ashcroft, E. B. Andreae, A. L. Packham, S. Vidot, A. G. E. Wilcock, T. C. Murphy, J. M. Norman, E. W. Bowell, H. J. C. Churchill, W. W. Newton, W. Brown, L. W. Hughes, A. B. Black, R. G. Battersby, J. J. Mulvey, N. S. Bruce, R. McGregor, W. J. Walters, A. Rose-Innes, A. Robertson, L. Jefferson, J. Rowland, J. H. Wiseman, W. H. White, R. N. Burton, L. Gill, H. Gainsborough, W. B. Mathewson, S. T. Alexander, J. C. C. Howe, J. Wilson, J. A. Keen, A. B. MacDougall, W. L. Agnew, C. G. Irwin, J. Irvine, H. E. Charles, H. V. Horsfall, J. H. Parker, N. Pick, C. H. Smith, C. Reid, W. Eidinow, A. B. Platt, W. T. G. Boul, R. D. Aylward, H. M. Holt, N. Kletz, W. W. Brown, R. Mailer, J. H. R. Smith, S. L. Smith, W. A. Weatherhead, R. J. L. Fraser, E. P. Irving, J. Joels, D. S. Mitchell, F. W. Sandeman, H. D. Apergis, A. Y. Milne, H. G. Morris-Jones, H. B. Dodwell, M. Edwards, N. P. R. Galloway, J. G. Allan, F. Bendix, C. M. Titterton, H. B. Renton, F. Jones, A. McL. Pickup, O. C. Carter, G. L. Malcolm-Smith, W. U. D. Longford, J. J. Robertson, A. B. Cocker, J. Michaelson, J. Marshall, J. W. Morris, M. J. Hilton, J. G. McK. Macaulay, G. R. Sharp, E. S. Phillips, W. D. MacKinnon, R. F. C. H. Buchanan, J. B. D. Galbraith, A. Riddell, W. H. Wallace, H. Taylor, C. H. Warner, C. G. Magee, S. M. Riddick, W. B. Buer, J. Thompson, W. H. Rowden, J. L. D. Buxton, F. L. Richard, G. N. Groves, S. Riddiough, I. Liberman, W. M. Kerr, J. F. Twort, W. A. Fraser, W. G. F. Owen-Morris, J. W. C. Fairweather, C. F. J. Carruthers, W. P. Nelson, E. B. Ash, W. E. Le G. Clark, G. W. Coombes, T. Davies, D. V. Halstead, C. F. Rainer, R. B. Britton, B. B. Sharp, D. J. A. Lewis, J. Hope, A. V. Pegge, F. W. M. Lamb, R. M. Humphreys, A. E. Clark-Kennedy, C. B. Cohen, P. F. Bishop, R. B. Green, H. S. Carter, W. N. Goldschmidt, J. H. Tighe, M. Chalmers, A. E. Cochrane, W. S. L. McLeish, J. Nicolson, J. J. Treanor, W. A. Walker, N. E. ff. Kemm, J. Gilmour, J. C. Morris, J. S. Mann, C. W. Haward, W. A. Jackman, W. M. Savery, E. S. Jones, H. P. Gabb, R. W. C. Ball, T. A. Butcher, E. B. Verney, E. S. Rose, E. F. Rabey, E. Miller, G. S. L. Kemp, J. Peter, P. W. Putnam, R. H. Sutherland, D. O. Macdonald, H. A. Hill, M. Jackson, J. C. McGregor, A. C. Paterson, J. N. Gale, G. R. Ross, W. S. Herman, A. Abelson, J. Morrison, R. B. MacGregor, J. B. Potter, N. B. Peacock, E. S. Gawne, H. A. Cochrane, W. A. Coutts, E. M. E. Cumming, D. MacColl, R. J. Peters, J. H. E. Moore, W. A. Jaques, L. J. Schwartz, M. Melvin, J. Lipsey, T. McS. Wilson, C. O. Anderson, S. C. Critchley, C. P. Hines, A. Eidinow, E. E. R. Spurway, G. F. Peters, W. H. Simmons, F. Lyth, G. S. Lewis, L. H. Bartram.

Lieutenants retaining the rank of Lieutenant: G. V. Davies, F. Walton, J. W. Jones, G. V. W. Anderson, H. A. Chodah, A. R. C. McKerrow, W. A. Flynn, E. A. Leak, G. S. Escoffery, G. W. C. Dunlop, R. J. Patchett, W. A. Hewitson, J. M. Macpherson, S. G. Evans, E. A. Clegg, G. R. Baxter, C. C. H. Cuff, J. M. Melvin, D. Maclean, B. W. F. Armitage, G. G. Havers, M. S. Thomson, S. V. Goldhurst, A. S. Strachan, J. P. Kilty, A. P. McLeod, W. H. Palmer, W. A. Freedman, R. Gainsborough, A. St. G. J. McC. Huggett, W. B. Watson.

Temp. Major F. R. Lucas, T.D. (Major, 9th R. Scots, T.F.), relinquishes his temporary commission.

Temp. Lieut.-Col. A. D. Reid relinquishes his temporary commission.

Temp. Major W. T. F. Davies retains the rank of Major.

Temporary Captains granted the rank of Major: A. R. Green, H. H. Elliot, B. H. Woodyat.

Temporary Captains retaining the rank of Captain: F. H. Kitson, W. G. Marsden, J. J. Reynolds, I. W. Jones, M. J. Kelly, J. R. Slack, C. T. Cheatle, T. H. Thomas, T. F. B. Reid, E. G. Saunders, J. T. McCullagh, C. B. Ticehurst, G. A. Back, C. J. H. Aitken, J. Elder, G. M. Coope, F. R. Sturridge.

SPECIAL RESERVE OF OFFICERS.

Captains relinquishing the acting rank of Major: J. A. Hill, D. J. Armour, W. T. Thompson.

TERRITORIAL FORCE.

Major M. Dunning resigns his commission and is granted the rank of Lieutenant-Colonel, with permission to wear the prescribed uniform.

Capt. (acting Major) J. St. A. Titmas relinquishes the acting rank of Major on ceasing to be specially employed.

Capts. J. H. Hunter, J. M. Smith, and W. C. Macaulay to be Majors.

Capt. M. U. Wilson resigns his commission and is granted the rank of Major.

Captains resigning their commissions and retaining the rank of Captain: A. M. Young, T. L. Ashforth, C. R. Woodruff, H. C. H. Bracey, A. W. Hayward, R. B. Reed, J. S. Hopwood.

Capt. J. H. Owens to be acting Major whilst specially employed.

The undermentioned Captains to be Adjutants, School of Instruction: J. R. Hill, Lowland Division; J. H. Barry, 2nd London Division; O. W. McSheehy, 1st London Division; W. H. L. Allott, Highland Division; W. H. O'Riordan, East Lancs Division; J. R. Yourell, North Midland Division; Capt. (Bt. Major) C. S. F. Hamilton, D.S.O., Wessex Division.

1st London Sanitary Company: Capts. W. E. Smith and A. Romanes resign their commissions and retain the rank of Captain.

Home Counties Divisional Sanitary Section: Capt. A. E. Tait resigns his commission and retains the rank of Captain.

2nd London General Hospital: Capts. Sir W. A. Lane and Sir H. M. Rigby are restored to the establishment.

1st Eastern General Hospital: Capt. S. W. Curl resigns his commission and retains the rank of Captain.

2nd Eastern General Hospital: Capt. R. P. Nash is restored to the establishment on ceasing to hold a temporary commission in the R.A.M.C.

TERRITORIAL FORCE RESERVE.

Capt. G. L. Bunting resigns his commission and retains the rank of Captain.

ROYAL AIR FORCE.

Dental Branch.—Lieut. W. P. Bole is transferred to the unemployed list.

INDIAN MEDICAL SERVICE.

Capt. G. F. Graham to be Major.

Hon. Capt. Behram Pestonjee Sabawala to be Honorary Major.

Temp. Lieut. Sachchidananda Hoshan Paul to be temporary Captain.

The King has approved of the retirement of Col. F. R. Ozzard.

Surg.-Major Ralph Robert Scott, who served in the Crimea, died at Bath on June 1st, aged 88. He qualified in 1853, when he became a licentiate of the Royal College of Surgeons in Ireland, subsequently obtaining the Membership of the Royal College of Physicians of Ireland in 1879.

Parliamentary Intelligence.

HOUSE OF COMMONS.

TUESDAY, JUNE 1ST.

Hospital Treatment of Soldiers.

Mr. CLOUGH asked the Secretary for War how many sick or invalid soldiers who would otherwise by this time have been demobilised were still being retained for hospital treatment at the expense of the State; whether such hospital treatment was now thoroughly adequate; and what was the cost of it as represented in the Estimates for this year.—Sir A. WILLIAMSON (Financial Secretary to the War Office) replied: There are approximately 5000 soldiers in hospital in the United Kingdom who are eligible for demobilisation, and the daily cost is approximately £2500. The answer to the second part of the question is in the affirmative.

Three and a Half Million War Pensions.

Lieutenant-Colonel ASSHETON POWNALL asked the Minister of Pensions whether he could state the number of those receiving pensions arising out of the war in this country and in France; and the number of persons engaged in this country on the administration of such pensions, and the corresponding figure for France.—Mr. MACPHERSON: The number of persons receiving pensions in the United Kingdom in respect of disability or death in the present war is approximately 1,700,000, and, in addition, nearly 1,800,000 wives, children, and other persons dependent on pensioners are receiving allowances—thus making the total number of beneficiaries approximately 3,500,000. The precise number of persons receiving similar pensions or allowances in France is not available, but I am informed that the number is in excess of 3,000,000. The number of persons engaged on the administration of pensions in the employ of the Ministry on May 1st was 24,892. It has not been found practicable to ascertain the corresponding figure for France.

Major GODFREY PALMER asked the Minister of Pensions what was the present annual cost of war pensions; and whether he could now inform the House of the result of any actuarial or other estimate which had been prepared showing the anticipated increase or decrease of the annual cost of war pensions during the next 30 years.—Mr. MACPHERSON replied: The cost of war pensions administered by the Ministry of Pensions for the financial year 1920-1921 is estimated at £118,211,000. This figure includes the cost of treatment, but excludes administrative expenses. I am not aware of any attempt to forecast the future trend of the Pension Bill referred to, and having regard to the provision in the warrants for readjustment of rates in 1923 and annually thereafter according to the cost of living, I very much doubt whether any reliable figures could be obtained under present conditions.

Site of London University.

Sir WILLIAM DAVISON asked the President of the Board of Education what price the Government proposed to pay the Duke of Bedford for the site behind the British Museum which had been offered to the University of London; how many private residences, boarding-houses, or hotels were included in the site; what was the estimated number of the population which would be displaced; what arrangements for their rehousing had been made; and whether the Government had considered the desirability of acquiring the site of the Foundling Hospital which was in the immediate vicinity and of approximately the same area, but had the advantage of not being intersected by roads or subject to leases, and would not involve the rendering homeless of many families, but would enable the trustees of the hospital to remove their children to the country, as they were anxious to do.—Mr. FISHER replied: In view of the fact that the matter is still under negotiation and the purchase is not yet actually completed, I am not in a position to make any statement as to the price proposed to be paid to the Duke of Bedford. A full description of the site, including an enumeration of the number of houses on it and the dates of the termination of leases, has already been published. As the great majority of the leases do not fall in until 1923 and after that date, no immediate provision for rehousing is necessitated. After full consideration of all the relevant circumstances the Government decided that the Foundling Hospital site was less suitable for the purpose than the site behind the British Museum.

Sir W. DAVISON asked whether the right honourable gentleman was aware that the Senate of the University had already expressed a preference for the Foundling Hospital site as compared with the site behind the British Museum belonging to the Duke of Bedford, and would he inform the House why the Government were endeavouring to force the University to accept a site which was more expensive and less suitable to the University.—Mr. FISHER: I am perfectly aware that many years ago when the London University question was in an entirely different position the Senate of that University came to that conclusion, but the Government has no doubt that as between the two sites the site now selected and offered to the University is preferable, first, because of its proximity to the British Museum, the greatest repository of literary study in the world; secondly, because of its proximity to University College; and, thirdly, because of its more central position. The Government are not attempting to force the University to accept the site. They may accept or decline it.—Sir J. D. REES: Will the cost in either case fall upon the public funds? Is it absolutely necessary to incur any such charge at the present time?—Mr. FISHER: It is perfectly true that the cost will fall upon the public funds, but it is offset by the value of the site and buildings at present occupied by London University in the Imperial Institute, and King's College, which will be liberated.

Government and Voluntary Hospitals.

Mr. LEONARD LYLE asked the Minister of Health whether it was proposed to create a new hospital service to which the municipalities must coöperate with the State; and what was the exact policy of the department towards existing voluntary hospitals on the one hand and towards general hospital provision on the other.—Dr. ADDISON replied: It is not intended that the Government should take over voluntary hospitals, but I cannot undertake within the limits of a reply to a Parliamentary question to discuss the exact relation of voluntary institutions to the general scheme of public health services.—Mr. LYLE: May I ask whether in view of the financial position of the voluntary hospitals to-day the right honourable gentleman will consider the advisability of issuing a statement of policy at an early date?—Dr. ADDISON replied: We are giving the matter our attention from day to day, and I hope that I shall be able to make a satisfactory statement before long.

Appointment of Women Doctors.

Mr. A. T. DAVIES asked the Minister of Health the result of his representations to the authorities of Sheffield-street Hospital for Women, Clare Market, W.C.2, with reference to the appointment of women doctors as medical officers and assistant medical officers respectively.—Dr. ADDISON replied: I am in communication with the authorities of the hospital in regard to this matter, but I have not yet received their reply.

Administrative Posts at Health Ministry.

Mr. A. T. DAVIES asked the Minister of Health how many administrative posts in the Ministry of Health were held by men at a salary of over £500.—Dr. ADDISON replied: The number of administrative posts, including within this definition posts strictly defined as executive in the Ministry of Health held by men at a salary of over £500, is 103.

Welsh Board of Health.

Sir J. CORY asked the Minister of Health what officers had been appointed to constitute the Welsh Board of Health, and what special functions each was to fulfil.—Dr. ADDISON replied: The Welsh Board of Health is at present constituted as follows: Sir Thomas Hughes, Chairman; Dr. Llewellyn Williams, M.C. (Medical Member); Mr. John Rowland, M.V.O., C.B.E. (Deputy Controller of Insurance for Wales); Mr. A. Lloyd Thomas (Housing Commissioner); Mr. Percy Watkins (Secretary, Administrative Officer for Public Health and ex-officio member of the Board).

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.

CHATFIELD, H. T., M.B., B.Ch., B.A.O. Belfast, has been appointed Tuberculosis Medical Officer by the Plymouth Town Council.

DARBYSHIRE, J., L.R.C.P. & S. Edin., Medical Officer for Woodbury, Aylesbeare, and Farringdon (Devon).

DEPREE, H. T., Medical Officer and Public Vaccinator for the No. 1 District, Exeter.

DOWNES, H., M.B., C.M. Edin., Medical Officer of Health for Chard.

LEE, H., M.B. Camb., F.R.C.S. Eng., Specialist Medical Referee under the Workmen's Compensation Act, 1906, for County Court Circuits Nos. 12 and 14, with a view to his being employed in ophthalmic cases.

Southmead Infirmary, Bristol: NIXON, J. A., C.M.G., M.B., B.C. Cantab., F.R.C.P. Lond., Consulting Physician; WATSON-WILLIAMS, P., M.D. Lond., Honorary Consulting Surgeon in Charge of Ear, Nose, and Throat Department; DAVIS, O. C. M., D.Sc. Lond., D.Sc., M.B., B.Ch. Bristol, Consulting Physician for Diseases of Children; KYLE, H. G., M.D., B.Ch. Oxford, Consulting Surgeon.

Certifying Surgeons under the Factory and Workshop Acts: WOOD, W. V., M.R.C.S., L.R.C.P. Lond. (Yatton); FARMER, M. L. M.B., Ch.B. Liverp. (Burton-on-Trent).

Vacancies.

For further information refer to the advertisement columns.

Aberdeen University.—Lecturer in Anatomy. £400.
Aylesford, Preston Hall.—M.O. £600.
Barnsley County Borough.—M.O.H. £850.
Bath, Winsley Sanatorium.—Sen. Res. M.O. £500.
Battersea Polytechnic, London, S.W.—Lect. and M.O. at Maternity and Child Welfare Centres. £600.
Belgrave Hospital for Children, Clapham-road, S.W.—Hon. Radiographer. 50 gs.
Birmingham, Queen's Hospital.—Three H.P.'s, three H.S.'s, Obstet. and Ophthal. H.S., and Cas. H.S. £90 each.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. £150.
Brentwood Mental Hospital, Brentwood, Essex.—Locum Tenens Asst. M.O. £7 7s. per week.
Brighton, Hove and Preston Dispensary.—Res. M.O. £200.
Brighton, New Sussex Hospital for Women and Children, 4-6, Ditchling-road.—Asst. S. and Asst. Anæsth.
Bristol General Hospital.—Cas. H.S. £175.
Bristol Royal Infirmary.—H.S.'s, H.P.'s, Obstet. H.S., Cas. O., Ophthal. H.S., and Dent. H.S.
Bury and District Joint Hospital Board.—Res. Asst. Med. Supt. £450.
Bury St. Edmunds, West Suffolk General Hospital.—H.S. £200.
Cambridge, Addenbrooke's Hospital.—H.P. and H.S. £130 each.
Canterbury, Kent and Canterbury Hospital.—Sen. Res. M.O. £200.
Cardiff City Mental Hospital, Whitchurch, near Cardiff.—Second Asst. M.O. £350.
Central London Ophthalmic Hospital, Judd-street, W.C.—Asst. S.
Central London Throat and Ear Hospital, Gray's Inn-road.—Hon. Asst. Anæsth.
Charing Cross Hospital, Agar-street, W.C.—Surg. Registrar. £150.
Chelsea Infirmary.—Second Asst. M.O. £325.
Chester County Asylum.—Third Asst. M.O. £350.
City of London Hospital for Diseases of the Chest, Victoria Park, E.—Asst. M.O. £150.
Colchester, Essex County Hospital.—H.P. £200.
Colchester, Royal Eastern Counties' Institution for Idiots, Imbeciles, and the Feeble-Minded.—M.O. £350.
Colchester, Severalls Mental Hospital.—Asst. M.O. 7 gs. per week.
Derby, Derbyshire Hospital for Sick Children.—Female Res. M.O. £150.
Doncaster Royal Infirmary and Dispensary.—Asst. H.S. £225.
Dorset County Asylum, near Dorchester.—Sec. Asst. M.O. £380.
Dumfries and Galloway Royal Infirmary.—Res. H.S. and Asst. H.S. £150 and £75.
Essex County Council and Tendring Rural District Council.—Asst. County M.O.H., &c. £600.
Gravesend Hospital.—H.S. £200.
Great Northern Central Hospital, Holloway-road, London, N.—Res. M.O. £250.
Hackney Metropolitan Borough.—M.O.H. £1000.
Halifax Royal Infirmary.—H.S. £200.
Hampstead General and North-West London Hospital, Haverstock Hill, N.W.—H.P., Cas. S.O., Cas. M.O. £150 each.
Holborn and Finsbury Hospital, Archway-road, N.—Sec. Asst. M.O. £300.
Hospital for Sick Children, Great Ormond-street, W.C.—P.
Huddersfield Royal Infirmary. Sen. H.S. £250.
Hull Royal Infirmary.—Sen. H.S. £200. Asst. H.S. £150.
Johannesburg, South African School of Mines, &c.—Professor of Pharm. £1000.
Kent County Mental Hospital, Maidstone.—Jun. Asst. M.O. £300.
Leamington Spa, Warneford, Leamington, and South Warwickshire General Hospital.—Hon. S.
Leeds Public Dispensary.—Res. M.O. £200.
Leicestershire County Council.—Female Asst. Sch. M.O. and Asst. Infant Welfare M.O. £500.
Lindsey County Council.—Female Asst. M.O. £550. Also Asst. Tuberc. O. and Asst. Sch. M.O. £550.
Liverpool, City Hospital, Parkhill, Sanatorium for Tuberculosis.—Asst. Res. M.O. £300.
Liverpool, David Lewis Northern Hospital.—H.P. £150.
London Lock Hospital, 91, Dean-street, Soho, W.—Clin. Assts.
London Temperance Hospital, Hampstead-road, N.W.—Cas. O. £200.
Manchester Children's Hospital, Pendlebury, near Manchester.—Res. M.O. £150.
Manchester, East Lancashire Tuberculosis Colony.—Res. Med. Supt. and Organiser. £700.
Manchester, Monsall Fever Hospital.—Sec. Med. Asst. and Third Med. Asst. £300 each.
Manchester Royal Infirmary.—Asst. Res. Surg. O. £200. Also Second Res. M.O. £100.
Metropolitan Hospital, Kingsland-road, E.—H.P., H.S., Asst. H.P., and Asst. H.S. £100.
Miller General Hospital for South-East London, Greenwich-road, S.E.—Sen. Res. M.O. £350.
Milnathort, Kinross-shire, Glenlomond Sanatorium.—Res. M.O. £600.
Newcastle-upon-Tyne, Hospital for Sick Children.—Jun. Res. M.O. £200.
Newport, Mon., Royal Gwent Hospital.—Two Res. M.O.'s. £200 and £180 respectively.
Northallerton, North Riding of Yorkshire County Council.—Chief Clin. Tuberc. O. £700.
Nottingham Children's Hospital.—Female Res. H.P. £200.
Nottingham City Asylum.—Second Asst. M.O. £400.
Nottingham General Hospital.—H.P. Also Cas. H.S. £200 each.
Nottingham, Notts County Council.—Female Asst. Child Welfare M.O. and Asst. Sch. M.O. £500.
Pietermaritzburg, Natal, Grey's Hospital.—Jun. H.S. £400.
Powick, Worcester County and City Mental Hospital.—Jun. Asst. M.O. £300.
Prince of Wales's General Hospital, Tottenham, N.—Jun. H.P. £120. Also Clin. Assts.
Putney Hospital, Lower Common, Putney, S.W.—Hon. Radiologist.
Reading, Royal Berkshire Hospital.—H.S. £200.
Rochdale Infirmary and Dispensary.—Sen. H.S. £200. Jun. H.S. £125.
Roll of Honour Hospital for Children, 688, Harrow-road, W.—Female Anæsth. £90.
Rotherham Hospital.—Jun. H.S. £150.
Royal Institute of Public Health, 37, Russell Square, W.C.—Lecturer and Demonstrator of Bacteriology. £500.
Royal Veterinary College, Camden Town.—Chair of Anatomy. £600.
Royal Waterloo Hospital for Children and Women.—Jun. Res. M.O. £100.
Ryde, Royal Isle of Wight County Hospital.—Res. M.O. £250.
St. Marylebone Workhouse.—Visiting M.O. £450.
St. Mary's Hospital, Paddington.—Secretary. £800.
Serbia.—S. for Orthopædic Work for Disabled Soldiers.
Sheffield Royal Hospital.—Asst. Cas. O. £150.
Sheffield Royal Infirmary.—H.P. and H.S. £150 each.
Shirlett, near Much Wenlock, King Edward Memorial Sanatorium.—Res. Med. Supt. £450.
Shrewsbury, Royal Salop Infirmary.—H.P. £200.
Staffordshire General Infirmary, Stafford.—H.S. £250.
Storthes Hall Asylum, Kirkburton, near Huddersfield.—Asst. M.O. £400.
Swansea General and Eye Hospital.—H.S. £200.
Truro, Tehidy Sanatorium.—Res. M.O. £300.
University of London, King's College for Women Household and Social Science Department.—Chair of Physiology. £800.
Victoria Hospital for Children, Tite-street, Chelsea, S.W.—Sen. Res. M.O. £250.
West Bromwich and District Hospital.—Res. H.S. £200.
West London Hospital, Hammersmith, W.—H.P. £50. Also Clin. Assts.
Whitehaven and West Cumberland Infirmary.—Res. H.S. £225.
Wolverhampton and Staffordshire General Hospital.—Res. M.O. £200. Also H.S. £200.

The Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Braintree and Johnstone.

Births, Marriages, and Deaths.

BIRTHS.

MCDOUALL.—On May 14th, at Red Bank, Hornsey-lane, Highgate, N., the wife of Dr. J. C. S. McDouall, West African Medical Service, of a son.

RABAGLIATI.—On May 21st, at Durban, Natal, S. Africa, the wife of A. H. Rabagliati, M.D., F.R.C.S.E., of a son.

WELLS.—On May 28th, at 15, Postley-road, Maidstone, the wife (nee Hewlett) of G. E. Headlam Wells, Nantonga Estates, Kampala, Uganda, of a son.

MARRIAGES.

SYKES—PRESTON.—On 1st June, 1920, at Holy Trinity Church, Scarborough, by the Rev. H. Drown, Dr. Frank Sykes, stepson of Dr. Walker and Mrs. Walker, of Batley, to Bessie Colbert, elder daughter of the late Mr. J. T. Preston, Dennistoun, Glasgow, and of Mrs. Preston, of 14, Grosvenor-road, Scarborough. At Home, Garfield House, Otley, Yorkshire, 25th and 26th August.

ENGAGEMENT.—GRAEME ANDERSON—HOOD.—The engagement is announced between Major H. Graeme Anderson, M.B.E., M.D., Ch.B., F.R.C.S., Surgical Consultant to the Royal Air Force, of 75, Harley-street, W., and Gladys, elder daughter of Charles Hood, of Hatch End, Middlesex.

DEATHS.

MORRISON.—On May 30th, at Devoran, Esplanade, Sidmouth, George Ernest Morrison, M.D., of Peking, Political Adviser to the Chinese Government.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.
THURSDAY, June 10th.—Papers: Mr. A. V. Hill and Mr. W. Hartree: The Thermo-elastic Properties of Muscle.—Sir James Dobbie and Mr. J. J. Fox: The Absorption of Light by Elements in the State of Vapour: 1. Selenium and Tellurium; 2. Mercury, Cadmium, Zinc, Phosphorus, Arsenic, Antimony.—Mr. H. G. Cannon: Production and Transmission of an Environmental Effect in *Simocephalus Vetulus* (communicated by Prof. E. W. MacBride).—Mr. E. C. Grey: The Enzymes of B. Coli Communis which are Concerned in the Decomposition of Glucose and Mannitol. Part IV., The Fermentation of Glucose in the Presence of Formic Acid (communicated by Prof. F. G. Hopkins).—Mr. L. T. Hogben: Studies on Synapsis. II., Parallel Conjugation and the Prophase Complex in Periplaneta, with Special Reference to the Premeiotic Telophase (communicated by Prof. E. W. MacBride).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MEETINGS OF SECTIONS.
Wednesday, June 9th.

OPHTHALMOLOGY (Hon. Secretaries—Malcolm Hepburn, W. H. McMullen): at 8 P.M.
CLINICAL EVENING.
Cases:
Mr. R. C. Charsley: Case of Tumour of the Lid.
Mr. A. W. Ormond: Case of von Recklinghausen's Disease.
Mr. W. H. McMullen: Cyst of the Iris.
Members who wish to show cases are requested to send particulars to Mr. W. H. McMullen, 133, Harley-street, W. 1.
Annual General Meeting—Election of Officers and Council for 1920-1921, at 9.30 P.M.

ROYAL SOCIETY OF ARTS, John-street, Adelphi, W.C.
MONDAY, June 7th.—8 P.M., Cantor Lecture:—Dr. W. Rosenhain: Aluminium and its Alloys.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.
THURSDAY, June 10th.—5 P.M., Croonian Lectures: Dr. A. F. Hurst: The Psychology of the Special Senses and their Hysterical Disorders. (Lecture I.)

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, June 7th.—2 P.M., Mr. B. Harman: Eye Department. 5 P.M., Dr. G. Stewart: Syphilitic Affections of the Nervous System.
TUESDAY.—12 noon: Mr. T. Gray: Demonstration of Fractures, &c. 5 P.M., Dr. R. J. Reece: Small-pox.
WEDNESDAY.—12 noon, Mr. Sinclair: Abdominal Diagnosis. 2 P.M., Mr. D. Armour: Demonstration of Surgical Cases.
THURSDAY.—10.30 A.M., Dr. Simson: Gynæcological Demonstration. 5 P.M., Mr. Baldwin: Practical Surgery.
FRIDAY.—10 A.M., Dr. McDougal: Electrical Department. 5 P.M., Mr. MacDonald: Stricture.
SATURDAY.—10 A.M., Dr. A. Saunders: Medical Diseases of Children. 2 P.M., Dr. Owen: Medical Out-patients.
Daily:—10 A.M., Ward Visits. 2 P.M., In-patient and Out-patient Clinics and Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, June 7th.—2.30 P.M., Mr. J. B. Banister: Gynæcological.
TUESDAY.—9.45 A.M., Lieut.-Col. R. H. Elliot: Selected Eye Cases and Operations. 2.15 P.M., Selected Cases:—Mr. Benians: The Normal Protective Mechanisms of the Body against Bacterial Invasion. 3.15 P.M., Clinical Lecture:—Mr. C. H. Hayton: Syphilis of the Upper Respiratory Tract. 4.30 P.M., Lecture: Sir Frederick Mott, K.B.E.: The Diagnosis of Functional Paralysis.
WEDNESDAY.—2.30 P.M., Dr. W. J. Oliver: Dermatological.
THURSDAY.—2.30 P.M., Mr. N. Fleming: Eye Cases. Dr. J. Metcalfe: Radiology.
FRIDAY.—2.30 P.M., Dr. C. E. Sundell: Diseases of Children.
SATURDAY.—3 P.M., Mr. Carson: Selected Surgical Cases.
Daily:—2.30 P.M., Operations, Medical and Surgical Clinics, &c.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, W.C. 1.
MEDICAL SCHOOL.
MONDAY, June 7th.—2–3.30 P.M., Out-patient Clinic: Dr. Collier. 3.30 P.M., Mr. Paton: Visual Fields.
TUESDAY, June 8th.—2–3.30 P.M., Out-patient Clinic: Dr. Grainger Stewart. 3.30 P.M., Dr. Greenfield: Tissue Reactions to Lesions in the Central Nervous System.
WEDNESDAY, June 9th.—2 P.M., Mr. Sargent: Surgical Aspects of Cerebral Tumour. 3.15 P.M., Dr. Collier: Syringomyelia.
THURSDAY, June 10th.—2–3.30 P.M., Out-patient Clinic: Dr. Farquhar Buzzard. 3.30 P.M., Dr. Farquhar Buzzard: Encephalitis.
FRIDAY, June 11th.—2–3.30 P.M., Out-patient Clinic: Dr. Gordon Holmes. 3.30 P.M., Dr. Tooth: Tabes Dorsalis.
Fee for Post-Graduate Course £7 7*s*. C. M. HINDS HOWELL, Dean.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
Special Post-Graduate Courses in Diseases of Children, illustrated by cases, specimens, and radiograms.
Mr. A. T. Pitts: The Pathology, Results, and Treatment of Dental Sepsis in Children (in the Out-patient Department)—
WEDNESDAY, June 9th.—4 P.M., Lecture IV., The Prevention of Dental Caries.
Dr. R. Hutchison: Disorders of Digestion and Nutrition in Childhood (in the Museum)—
MONDAY, June 7th, AND THURSDAY.—11 A.M., Lecture II., Dyspepsia in Infancy. Lecture III., Cœliac Disease.
Dr. T. Thompson: Diseases of the Central Nervous System in Children (in the Museum)—
MONDAY, June 7th, AND THURSDAY.—9.15 A.M., Lecture II., Meningitis. Lecture III., Cerebral Tumours in Childhood.
Dr. D. N. Nabarro: Methods and Significance of Pathological Investigations (in the Pathological Laboratory)—
TUESDAY, June 8th, AND FRIDAY.—5 P.M., Lecture II., Examination of Blood (*concluded*):—Agglutination Tests: Wassermann Reaction. Lecture III., Examination of the Cerebro-spinal Fluid.
Mr. G. Waugh: Diagnosis and Treatment of Common Surgical Disorders in Children (in the Museum)—
TUESDAY, June 8th, AND FRIDAY.—5.15 P.M., Lecture I., Children as Subjects for Surgical Procedures. Lecture II., Acute Inflammation of Bone.
Mr. T. Higgins: Common Surgical Disorders of the Naso-pharynx and Annexa in Childhood (in the Museum)—
MONDAY, June 7th, AND THURSDAY.—5.15 P.M., Lecture II., Naso-pharyngeal Suppuration. Lecture III., Cervical Adenitis.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.
MONDAY, June 7th.—5.30 P.M., Post-Graduate Lecture:—Dr. Goodall: The Pulse in Diagnosis.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON).
A Course of Post-Graduate Lectures on Syphilis is being given by various members of the staff of King's College Hospital during the present year.
FRIDAY, June 11th.—9.15 P.M., Dr. S. A. K. Wilson: Syphilis in the Nervous System. (II.)

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton, S.W.
MONDAY, June 7th.—2 P.M., Dr. Melville: X Ray Department.
TUESDAY.—2 P.M., Dr. D. Grant: Throat Department. 2.30 P.M., Demonstration:—Dr. Burrell: Cases after Artificial Pneumothorax.
WEDNESDAY.—10.30 A.M., Dr. Punch: Demonstration of Museum Specimens. 2 P.M., Dr. Gosse: Cardiographic Department. 2.30 P.M., Demonstration:—Dr. Melville: Artificial Pneumothorax X Ray Demonstration.
THURSDAY.—10.30 A.M., Dr. Burrell: Artificial Pneumothorax. 2.30 P.M., Demonstration:—Dr. Hartley: Bronchiectasis.
FRIDAY.—2 P.M., Dr. Melville: X Ray Department. 2.30 P.M., Demonstration:—Dr. D. Grant: Throat Cases.
SATURDAY.—1 P.M., Dr. Batty Shaw: Special Demonstration in the Out-patient Department.

ST. MARYLEBONE GENERAL DISPENSARY, 77, Welbeck-street, Cavendish-square, W.
Post-Graduate Course on Infant and Child Welfare.
TUESDAY, June 8th.—10.30 A.M., Dr. E. Pritchard: Practical Demonstrations on the Management and Feeding of Infants and Young Children—Lecture III., How to Examine an Infant and Keep Records.
THURSDAY.—3 P.M., Lecture IV., Breast Feeding.

UNIVERSITY OF LONDON.
Advanced Lectures in Physiology to Students of the University and others interested in the subject.
A Course of Eight Lectures on the Bio-Chemistry of Sterols will be given in the Physiological Laboratory of the University, South Kensington, S.W.
TUESDAY, June 8th.—5 P.M., Lecture IV., Mr. J. A. Gardner.

UNIVERSITY OF SHEFFIELD—FACULTY OF MEDICINE POST-GRADUATE LECTURES, at the Sheffield Royal Infirmary.
WEDNESDAY, June 9th.—4 P.M., Prof. Connell: Lesions of Fingers and Colles's Fracture.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.
TUESDAY, June 8th.—4.30 P.M., Lecture:—Dr. G. R. Murray: Examination of the Thyroid Gland and its Functions (*continued*).

MANCHESTER FRENCH HOSPITAL POST-GRADUATE LECTURES, 24, Acomb-street (behind Whitworth Park).
THURSDAY, June 10th.—4.30 P.M., Dr. W. Stirling: Some Common Eye Diseases.

BOOKS, ETC., RECEIVED.

BAILLIÈRE, TINDALL, AND COX, London.
Atlas for Electro-Diagnosis and Therapeutics. By Dr. F. Miramond de Laroquette. Authorised translation by Mary G. Cheetham, with Foreword by Dr. Robert Knox. Pp. 180.

BALE, JOHN, SONS, AND DANIELSSON, London.
The Doctor's Manual or Practitioner's Vade Mecum. By A. H. Hart, M.S. 4th ed. 10*s*. 6*d*.
The Industrial Clinic. Edited by Prof. Edgar L. Collis, M.D. Pp. 240. 10*s*. 6*d*.
A Text-book of Pathology. By F. Delafield, M.D., and T. M. Prudden, M.D. 11th ed., revised by F. C. Wood, M.D. Pp. 1354. 63*s*.

FROWDE, HENRY, AND HODDER AND STOUGHTON, London.
Operative Surgery. By Prof. A. Thomson, F.R.C.S. Edin., and A. Miles, F.R.C.S. Edin. 3rd ed. Pp. 217. 16*s*.

LEWIS, H. K., AND CO., London.
Backwaters of Lethe (Some Anæsthetic Notions). By G. A. H. Barton, M.D. Pp. 151. 5*s*.
The Systematic Treatment of Gonorrhœa in the Male. By N. Lumb, late R.A.M.C. 2nd ed. Pp. 123. 5*s*.
Public Health Laboratory Work (Chemistry). By H. R. Kenwood, C.M.G., Chadwick Professor of Hygiene. 7th ed. Pp. 420. 15*s*.

SAUNDERS, W. B., and Co., London and Philadelphia.
Surgical Shock and the Shockless Operation. By Prof. George W. Crile, M.D., and William E. Lower, M.D. Pp. 272. 21*s*.
Text-book of Physiology. By Russell Burton-Opitz, M.D., Ph.D. Pp. 1185. 32*s*. 6*d*.
Diseases of the Chest and the Principles of Physical Diagnosis. By George William Norris, A.B., M.D., and H. R. M. Landis, A.B., M.D. Pp. 844. 35*s*.

Notes, Short Comments, and Answers to Correspondents.

NOTES ON PSYCHOANALYSIS AND PSYCHOTHERAPY.[1]

BY SIR JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.,
LORD CHANCELLOR'S VISITOR IN LUNACY.

PART I.

I WOULD acknowledge first our debt to psychoanalysis for having induced us to take a more psychical and a less material view of insanity, and for having insisted on the importance of tracing it back to its earliest manifestations. The illuminating discoveries of the last 90 years—I date from Marshall Hall—in the structure and functions and pathological changes of the brain and nervous system have concentrated attention, not exclusively but perhaps too much, on the somatic relations of insanity. It is well, therefore, that we should be recalled to the psychical factors in insanity. The pronounced nature of the psychical symptoms in a large majority of the cases brought under our observation in asylums, and their obvious dependence on coarse material changes, may have accustomed us to rest too generally content with these, and to fail to follow up fully in another and much smaller class of cases, clues which might conduct us to the purely functional disorders out of which the insanity has arisen.

Psychoanalysis Not a New Method.

But while gratefully appreciating the impetus given by psychoanalysis to the diagnosis of insanity by experimental methods and to ætiological research, I cannot admit that its methods are novel, or that there has ever been a time when such of them as are not objectionable have not been in use in our asylums. Hypnosis and crystal-gazing, association tests, and free association have certainly not been in vogue, but in every case some effort has been made by repeated skilled interrogation, by confidential discussion, by appeals to the emotions, by the stirring up of memories, by the observation of conduct, and even by the interpretation of dreams (Maudsley suggested that patients should be set to keep noctuaries instead of diaries), to get at the cause of the altered mental mechanism. It is not correct, as has been alleged, that in psychology, up till now, it is the intellectual factors of mental activity that have been almost solely considered, while emotional and instinctive states have been overlooked and neglected. An ample refutation of that will be found in the writings of the phrenologists, of Dugald Stewart, of Thomas Brown, of Alexander Bain, of Laycock, and of a score of others. While in medical psychology delusion has, perhaps, assumed an unduly prominent place owing to its convenience as a fact indicating insanity in all legal documents, states of exaltation and depression, blunted sensibility and perverted feeling, impulses and morbid appetites, obsessions and phobias of all kinds have bulked quite as largely as delusions in case-book reports. It is at what are called subconscious mental states that medical psychologists have stopped short, simply because such subconscious mental states are beyond direct scientific observation, and are matters of inference or speculation. Our knowledge of the existence of subconscious mental states is obtained, as in the case of a simple reflex act, by watching their physical effects. Psychoanalysis does not give access to the unconscious, but it ransacks the memory for its hidden stores and expatiates in suppositions, complexes, and mythical conflicts. The question comes to be whether its explorations are really worth while. Life seems a little too short for psychoanalysis. The examinations are, we are informed by Jung, laborious and often fruitless, and require almost unlimited time. A case is described by Jung in which two hours were expended in extorting from a young woman labouring under dementia præcox that she had seen a man with whom she had fallen in love, and that when a girl of 16 she had met when out walking an elderly idiotic woman whom she had provoked to obscene behaviour, and the result of all this protracted probing was that the patient, who was judged to have suffered from regret and remorse in conflict with religious conversion, "improved considerably." Dr. Stoddart tells us that "not only is the technique of psychoanalysis extremely difficult, requiring years of practice to obtain proficiency therein, but each individual case requires an enormous time. Even in the hands of the great masters of psychoanalysis the shortest cases take an hour a day for three months, and some take an hour a day for three years."

[1] Being an overflow from the Maudsley Lecture delivered before the Medico-Psychological Association of Great Britain and Ireland on May 20th, 1920.

Doubtful Superiority to other Methods.

Onerous and enervating as must be the practice of psychoanalysis and the acquirement of its technique, our asylum medical officers would not grudge the time and toil required for it if it yielded better results than the methods of diagnosis and treatment hitherto in use, but on that point we have no conclusive evidence. There are no trustworthy statistics bearing on it. No doubt a large number of patients suffering from psychoneuroses have recovered rapidly under psychotherapy, and this has been especially notable in patients suffering from war-induced psychoneuroses; but it is to be noted that these cases have for the most part been of a mild description, of emotional origin, and of recent date, and that similar recoveries have taken place without any psychotherapeutical treatment and under other kinds of treatment than the psychotherapeutical; some of the war psychoneuroses came and went, as it were, of their own accord. Many men affected by them have returned to the front after few days at a base hospital and such rough-and-ready psychotherapy as could be there supplied—namely, a little friendly exhortation and good advice—and many who have been sent home have recovered promptly under autotherapy, or the exercise of their own common-sense. Readjustment to reality in such cases has been speedily effected on withdrawal from the poignant situation in which the mental disturbances arose, and a glass of wine has sometimes facilitated the readjustment. One of the ablest advocates of psychoanalysis in this country, Dr. Ernest Jones, has said: "Even if it were possible, I see no reason why psychoanalysis should be undertaken in the majority of cases, for they can be cured in much shorter ways"; and another equally able advocate—Dr. Bernard Hart—has said: "Psychogenic disorders are not only capable of being favourably influenced by suitable psychological methods, but are capable of being unfavourably influenced by these methods when wrongly used." We have, as yet, no reliable information as to the subsequent history of shell-shock cases diagnosed by psychoanalysis and treated by psychotherapeutical procedure. How many have remained well, how many have relapsed, how many have ended in suicide, how many have, by circuitous routes, found their way into asylums? We must wait and see before we can appraise the merit of this much-vaunted modern innovation.

Certain Objections.

Nor is there, I think, any great call for a treatment irksome to those carrying it out, distressing to many patients, sometimes strongly resented, of problematical benefit, and occasionally injurious in its effects. Is not much of this psychoanalytical boring quite superfluous? An elaborate investigation of the skeleton and orthopædic apparatus is not of much assistance in the case of skin disease, and a resurrection of long-buried psychical experiences is unnecessary in a great majority of mental ailments. Reports of psychoanalytical successes sometimes suggest the waste on trivial cases of a great deal of psychological ammunition.

Psychoanalysis in moderation, in connexion with our old and well-tried methods of clinical observation and research may be very useful, but, pushed to an extreme, and finding for all mental troubles a background of incestuous thought, of jealous, masochistic, sadistic, or homosexual emotions, it becomes itself an offensive obsession. Freudism, notwithstanding the diligent efforts made to acclimatise it, will, I feel sure, never take root in this country. Sexual symptoms have never been ignored by British alienists; but they must not be invented as they are when the libido is lugged in at every turn of thought. Psychoanalysis is itself a conflict of complexes, for I find amongst its adherents divergences in theory and practice that are irreconcilable. The psychoanalysts ignore altogether the finalistic ideals which are far more dominating and characteristic than the basic instincts amongst which they burrow. The instinct of self-preservation is, of course, primary, because without it there could be no other, but it is only in proportion as it is linked up with the sentiment of other preservation or altruism that civilisation has advanced. We presume in a man all the ordinary human instincts, propensities, emotions, in varying amount and individual combination, but as long as they lie latent we know nothing about them; it is only when they express themselves in action that they come into our ken. There is a risk that in exploring for sexual rudiments we may plant the seeds of the very growth for which we are in search, and delusions of a sexual or obscene character are about the most persistent and dangerous encountered in the insane.

The main objection to psychoanalysis as at present presented to us lies, I think, in its over-valuation of mental conflicts and emotional states in the production of the psychoneuroses and of the efficacy of immediate personal legerdemain in their removal. The psychogenic factor has been strongly in evidence in the war, but even where it has appeared to be solely responsible for the nervous or mental breakdown in presumably neuro-potentially sound persons

we may depend upon it that the way was almost invariably prepared for it by hereditary predisposition or acquired habit, and that coöperative physical factors, such as fatigue or toxæmia or exhaustion from shortage of food or loss of sleep have also been at work. The psychoneurosis, however set up, had an anatomical substratum, however slight or transient, for we must always bear in mind that complete mental and neural parallelism upon which Hughlings Jackson so strongly insisted. The psychoneuroses are most conveniently explained in terms of psychology, are sometimes more accessible on the psychical side, and disappear under psychical treatment, but they can also be pictured as diverted nerve currents, can be thus approached, and pass away under treatment that restores nerve tone. In most of the cases in which psychical treatment has availed there have been coincident with it changes in physical surroundings, diet, drugs, &c., that have, perhaps, had some share in the favourable issue. Without in any way depreciating psychical treatment, I would say that, notwithstanding all the disclosures of psychoanalysis, the alienist physician will still be right in each case in regarding the physical ætiology as of primary importance. The purest of the psychoneuroses are apt to set up a recurrent habit, and, if unrelieved, to run on into structural degenerations that are beyond the reach of psychical medication.

Psychic and Physical Factors in the Causation of Insanity.

Psychogenesis is patent enough. Who has not witnessed the profound depression induced by a great sorrow, or the joyous excitement that has followed on a stroke of good fortune; and what medical man has not occasionally seen the undue prolongation of these and their intensification into mental disorder? With the general public psychogenesis holds the most prominent place in the ætiology of insanity. The relatives of the insane constantly ascribe their illness to some particular worry or distress, even when the disease is general paralysis or of obviously organic origin, and medical men have certainly never overlooked psychogenesis or the enthymic causes of insanity arising from impressive or exhausting thought, feeling, or emotion. But the clearest demonstration of a psychogenetic starting point and of a connexion between it and the psychical symptoms in a case of mental disease should never render unnecessary a thorough somatico-analysis. The bodily conditions associated with the mental failure should be closely investigated, for amongst them may be found the key to recovery. Intestinal stasis and putrefactive changes in the alimentary tract with the absorption of toxins from the mucosa are often responsible for hypochondriasis, which may merge, in those of neurotic temperament, in melancholia, if suitable treatment is not resorted to. No one can peruse the treatises on insanity of the first half of the last century without remarking that the physicians of the period did get wonderfully good results in certain cases by purgation. Pardo has shown, I think, conclusively that neurasthenia and some mental disorders occur in direct association with indoxyluria and disappear when the elimination of indoxyl is reduced from 10 to 20 per cent. above normal to zero. I have lately had an opportunity of seeing the notes of some cases under the care of Dr. B. H. Shaw at the Stafford County Asylum, in which attacks of delirium, confusional insanity, and melancholia, synchronising with acetonuria, yielded rapidly to an alkaline treatment. The toxins formed in the cerebro-spinal neurons subjected to stress—cholin, phosphoric acid, and particularly neurin—are highly poisonous substances, and upset mental equilibrium. They excite the thyroid to supra-normal activity, and the thyroid hormone, when produced in excess, breaks down fatty bodies in nerve and brain cells, thus accounting for many morbid, nervous, and mental phenomena. As Sir Frederick Mott has pointed out, it is probable that changes in the secretions of the thyroid and other ductless glands, causing a disturbance in the hormone balance, may not only predispose to mental instability, but actually induce it. It is probable also that disturbances in the sympathetic and autonomic nervous system are signalised by psychical disorders. Incipient tuberculosis and the sequelæ of typhoid fever and of dysentery are often provocative of mental disease. I am under the impression that in many cases of the psychoneuroses a study of cutaneous hyperæsthesia might have been even more instructive than psychoanalysis.

Suggestion in Therapeutics.

It will not be maintained that in cases of the kinds just mentioned, in which an adequate physical factor is at work, much benefit, pending its removal, could be derived from the most assiduous use of suggestion, persuasion, or re-education. The physical conflicts must be stopped before the mental ones can be assuaged. Attempts at the psychical dislodgment of the disorder will be futile until its physical foundation is removed. Of course, psychical remedies should never be neglected. They are as old as the hills. Job's comforters tried them on, but the danger is that the use of the principal remedies in the psychicoanalytical pharmacopœia are very apt to be divorced from medical guidance and control, and to be exploited empirically. In psychoanalysis the cross-examination that is to elicit a man's past transgressions might be more adroitly conducted by a barrister than a medical man, and in psychotherapy persuasion might be more persuasively urged by a clergyman versed in scruples of conscience and dialectics than by a man trained in the dissecting-room and bacteriological laboratory. That potent agent suggestion, of the sway of which every notorious public event affords examples, and on which the psychoanalyst largely relies, is the mainstay of the quack whose advertised triumphs are not all fictitious; very salutary effects are exerted by his confident predictions and startling examples, and I have no doubt that his grateful patients who are not frauds are chiefly neurotic subjects. The same is true, to some extent, of Christian Science, and of Lourdes, which has been the citadel of suggestion in our times. Extreme susceptibility to suggestion and to hypnosis implies a lowering of resistance in the highest nerve centres and an enfeeblement of the will, while in the healthy and well-balanced man the range of suggestion is strictly limited.

> O! who can hold a fire in his hand,
> By thinking on the frosty Caucasus?
> Or cloy the hungry edge of appetite
> By bare imagination of a feast?
> Or wallow naked in November snow
> By thinking on fantastic summer heat?

But the high-grade neurotic subject, the fakir or the devotee, can do all these things, or thinks he can, and the mildly mentally afflicted can sometimes, by suggestion, be beguiled out of their fantasies and back into rationality. The strong man is reasonably suggestible, but the hysterical girl responds to every hint.

(To be continued.)

FAMINE RELIEF IN THE UNITED PROVINCES OF AGRA AND OUDH, 1918–19.

THE marked deficiency of rain throughout the United Provinces of Agra and Oudh during 1918 had the natural result of diminishing the yield of food crops; only 60 per cent. of the early and 40 per cent. of the late rice crops were obtained compared with the average; maize yielded only 55 per cent. and millet only 40 per cent. The spring yield in 1919 was only 61 per cent. of the average. To complicate matters from the health point of view there was not only a general disturbance of economic conditions on account of the war, but, in addition, a disastrous epidemic of influenza, which carried off a large number of able-bodied labourers and left many dependents without means of livelihood. The Lieutenant-Governor, Sir P. Harcourt Butler, took a bold course, and decided that the policy to be followed should be one of liberal suspensions and remissions of revenue, combined with some relief to those who had been left destitute. A sum of no less than 200 *lakhs* of rupees (say £1,333,000) was given in advances for cattle, fodder, well construction, in aid of the sugar-cane crop, &c. Moreover, large remissions of revenue were granted, or its collection suspended. Mr. Percy Harrison was appointed Famine Commissioner. The Famine Code, embodying the accumulated experience of many previous similar visitations, was found to be an almost complete guide to the necessary operations. In this famine, in accordance with previous experience—

> "It has been proved beyond any question whatsoever that the testing of the necessity for relief is absolutely essential. There is no matter in which the idiosyncrasy of individual officers requires to be so closely checked as in the matter of the existence or otherwise of distress requiring relief."

In the hill districts of Garhwal, where there was a large demand on the local stocks of food by pilgrims visiting the shrines of Kedarnath and Badrinath, the main difficulty was how to transport food in sufficient quantities to the remote and inaccessible homes of the people who required it. Grain depôts were established under official management, and the pilgrim route was closed.

Measures of Utility.

In regard to the United Provinces generally various measures of real utility, such as the reclamation of waste lands in Etawah and construction of water-storage works in Bundelkhand, were undertaken with success; and in very many instances native gentlemen gave large sums in charitable relief. An important part of the work consisted in the procuring of a supply of fodder for cattle in the areas affected. Private traders were encouraged by the grant of concessions on rail transport-rates, and about double the quantity so obtained was supplied by official arrangements through the Forest Department from the State forests in Dehra Dun, the Tarai, and elsewhere. The experience gained on this occasion will probably result in precautionary arrangements being made for the speedy supply of fodder in any subsequent occurrence of famine in these provinces. As districts maintain programmes of works to be carried out on the occurrence of a famine, so might the Forest Department maintain programmes for famine fodder operations, with depôts, railway siding

accommodation, &c., always available. Power presses for fodder are recommended, as by their use only half the amount of rolling stock would be required for transporting a given quantity of hay. All necessary equipment of this sort should be regarded as an insurance against famine.

This narrative of the measures adopted for the relief of famine by Mr. J. D. Elliott, Secretary to Government, concludes with an acknowledgment of the services of numerous private individuals in the administration of district relief funds and of their public-spirited assistance in many ways. We may be allowed to add that it also affords abundant evidence of the practical genius of our countrymen in dealing with conditions of the greatest difficulty and emergency that can be imagined; and that if any justification for the British Raj in India were necessary, it would be found in ample measure in the plain "Narrative and Results of the Measures Adopted for the Relief of Famine during the Years 1918 and 1919" in the United Provinces of Agra and Oudh.

"QUEEN ELIZABETHES ACHADEMY."

A PAPER published in the *Bristol Medico-Chirurgical Journal* of March, 1920, by Mr. L. M. Griffiths deals with a little known tract entitled "Queen Elizabethes Achademy," the subject of which is "The erection of an Achademy in London for educacion of her Maiestes Wardes, and others the youth of nobility and gentlemen." The author was Sir Humphrey Gilbert, and he was apparently led to his proposal by the very poor opinion which he held of the Universities; "At this present, the estate of gentlemen cannot well traine up their children within this Realme but eyther in Oxford or Cambridge whereof this ensueth; first being there they vtterly lose their tymes yf they doe not follow learning only. For there is no other gentlemanlike qualitie to be attained. Also by the evill example of suche, those which would apply their studies are drawen to licentiousnes and Idleness; and therefore it were every way better that they were in any other place than theare." Gilbert's Achademy provided for instruction in subjects which practically coincide with The Seven Arts, together with Physic, Surgery, Law, Divinity, Cosmography, Heraldry, and foreign languages. Moreover, the scholars were taught the use of "the great horse." Physic and Surgery were to be taught in English, not in Latin, and it is interesting to note that as regards the library Gilbert anticipated the rule which holds at the Bodleian and the British Museum. "All Printers in England shall be for ever charged to deliver into the Liberary of the Achademy, at their owne Charges, one copy, well bownde, of euery booke, proclamcion, or pamflette, that they shall print." Gilbert's Achademy never materialised, but in the year 1700 an attempt was made by one Mr. Lewis Maydwell to obtain a Parliamentary grant to enable him to run an Academy for teaching "the Riding of the Great Horse and some other gentil Accomplishments" which he claimed were not to be had in the Universities. Mr. Maydwell's scheme was severely criticised by the then Savilian Professor of Geometry at Oxford, Dr. John Wallis, who in a most amusing letter stated that everything necessary for a gentleman was taught, or could be taught, at Oxford, and hinting, not obscurely, that Mr. Maydwell's scheme was only designed to make himself rich. It cannot be said that physical exercise is now neglected at the Universities, though it is not yet part of the University Course. Dancing, which is undoubtedly a most useful exercise, used to be part of the curriculum at Eton, the last boy to learn it, if we remember right, being the late Dr. Pusey.

ANALYTICAL NOTES ON DRUG SUPPLIES, 1914–1919.

THERE are some interesting disclosures in "Evans's Analytical Notes," covering the period 1914 to 1919, issued last week in pamphlet form by Messrs. Evans Sons Lescher and Webb, of 56, Hanover-street, Liverpool. These useful notes were published annually prior to the war, but the issue was discontinued in 1914. Amongst some of the items in this recent number calling for notice in regard to the purity of drugs are the following. Acetyl salicylic acid of English manufacture is reported to be equal in quality to anything that was produced abroad. Many samples of amyl nitrite failed to comply with the requirement of the B.P. that 90 per cent. should distil below 100° C. Arsenical impurity was found in samples of commercial borax and boric acid. Chloroform has under the tests made given uniformly satisfactory results according to B.P. requirements. Arsenic and lead were of constant occurrence in samples of cream of tartar. Acetone was found in samples of ether. The viscosity of paraffin liquidum was found to vary in the specimens examined from 71° to 300° (Redwood). The need for official standardisation on this point is obvious, as we indicated in a special inquiry upon the subject (THE LANCET, Oct. 2nd and 16th, 1915). Boric acid and sugar were found in veronal. Samples of potassium iodide contained a considerable quantity of potassium chloride. Many other examples could be quoted, but the foregoing show generally the interest of the compilation in addition to which some improved methods in regard to analytical procedure are described.

FIRST-AID GUIDES.

Colonel R. J. Blackham, Assistant Director of Medical Services at Chatham, and the author of several well-known manuals of first-aid and nursing, has compiled an excellent series of pocket guides to first-aid treatment, which are being published by Messrs. Dale, Reynolds and Co., 46, Cannon-street, London, price 6*d*. each. Two of these, No. 2 Hæmorrhage, and No. 3 Insensibility, lie before us, the form being a four-page card measuring 3½ in. by 5½ in. The instructions are printed in tabular form and in non-technical language, those in regard to hæmorrhage giving the signs of bleeding, the general first-aid treatment, and the methods of applying pressure, while those for insensibility set out its various kinds, the methods of recognising them, and their treatment. These cards should prove helpful to both instructor and pupil; to the first as a convenient form of lecture notes, and to the second as summaries of first-aid teaching which can be carried in the pocket and consulted at odd moments. In factories where the full-time doctor is not employed the distribution of such cards among the workers might be the means of saving life; and in any case it would help the patient till the arrival of the doctor.

THE ART OF PRACTICE.

WE have received a pamphlet entitled "The Management of Patients: Success in Practice," wherein an attempt is made to assess the relative importance of manner and professional skill in the successful treatment of private patients. The conclusions reached are greatly to the disadvantage of skill when divorced from other factors. The pamphlet is issued by the Post-Graduate Society, Thanet House, Temple Bar. There is attached an application form for a "course," in the form of a book, on tactics and therapeutics, which is compiled by an unnamed authority.

Harrovian will have to take legal advice on the whole case. As he sets it out, the Act would seem to apply.

Communications, Letters, &c., to the Editor have been received from—

A.—Austin Motor Co., Birmingham; Mr. A. S. Anderson, Northampton; Dr. J. M. Ahern, Rochester.

B.—Dr. J. S. Bury, Manchester; Prof. W. B. Bell, Liverpool; Dr. A. Blackhall-Morison, Lond.; Dr. S. A. Bonnerjee, Sangrur; Dr. H. C. Bazett, Oxford; Dr. A. Bygott, Bury St. Edmunds; British Red Cross Society, Lond.; Prof. Sir J. W. Byers, Belfast; Dr. A. Balfour, Lond.; Mr. W. G. Ball, Lond.

C.—Dr. H. C. Carpenter, Philadelphia; Sir J. Crichton-Browne, Lond.; Prof. E. L. Collis, Cardiff; Dr. F. G. Crookshank, Lond.; Crystal Palace, Lond., Manager of; Dr. M. Culpin, Loughton; Mr. H. Curtis, Lond.; Dr. S. Monckton Copeman, Lond.

D.—Department of Scientific and Industrial Research, Lond.; Miss J. Duncan, Lond.; Prof. G. Dreyer, Oxford; Mr. M. M. Dow, Falkirk.

E.—Dr. J. R. Earp, New York; Edinburgh Medical Missionary Society.

F.—Mr. E. T. Forrest, Lond.; Faculté de Médecine de Paris; Mr. H. Frankling, Harrogate; Mr. F. W. Friend, Brighton; Lieut.-Col. F. E. Fremantle, M.P., Hatfield.

G.—Dr. A. K. Gordon, Lond; Mr. E. W. H. Groves, Clifton; General Medical Council, Lond.

H.—Mrs. M. Hogarth, Lond.; Dr. C. W. Hutt, Lond.; Hospital for Sick Children, Lond.; Prof. A. J. Hall, Sheffield; Dr. G. W. Homan, Lond.; Hôpital Français de Manchester, Hon. Sec. of.

I.—Institute for Crippled and Disabled Men, New York; Inspectors of Lunatics for Ireland, Dublin; Insurance Committee for the County of London.

J.—*Journal of Mental Science*, Lond.

K—Col. W. G. King, I.M.S. (retd.); Kodak, Ltd., Lond.; King's College Hospital Medical School, Lond.

L.—Dr. R. B. Low, Lond.

M.—Mr. H. A. Mess, Lond.; Dr. C. Mackay, Lond.; Dr. J. F. D. Macara, Durness; Ministry of Health, Lond.; Mr. J. E. May, Lond.; Dr. D. W. Montgomery, San Francisco; Dr. W. Magner, Cork.

N.—New South Wales Department of Public Health, Sydney, Sec. of; Dr. F. L. Nicholls, Cambridge; National Anæsthesia Research Society, Lond.; Lieut.-Col. W. J. Niblock, I.M.S., Madras.

O.—Observer; Dr. R. A. O'Brien, Lond.

P.—Mr. G. F. Peacock, Ashford; Dr. J. H. Parsons, Sheringham; Post-Graduate Society, Lond.; Dr. Pfeifers, Leipzig; Col. A. G. Phear, Lond.; Mr. H. S. L. Polak, Lond.; Dr. C. E. Pronger, Harrogate.

R.—Royal College of Physicians of London; Mr. H. Rundle, Southsea; Royal Society of Arts, Lond.; Prof. O. Rossi, Sassari; Royal Society, Lond.; Royal Institute, Lond.; Royal Army Medical College, Lond., Sec. of; Dr. C. S. Redmond, Athy.

S.—Sir A. Stanley, Lond.; Prof. W. Stirling, Manchester; Dr. A. Smirthwaite, Whitley Bay; Dr. T. H. G. Shore, Lond.; *Stock Exchange Gazette*, Lond.; Messrs. Siemens Bros. and Co., Lond.; Save the Children Fund, Lond.; Messrs. Strange and Graham, Lond.; Society of Apothecaries of London.

T.—Dr. F. S. Tinker, Banstead; Mr. G. Thieme, Leipzig; Miss C. L. Thompson, Portsmouth; Dr. W. E. F. Tinley, Sandsend.

U.—University Grants Committee, Lond.; Mr. S. Unwin, Lond.; University of Bombay, Registrar of.

V.—Dr. F. Vicars, Lond.

W.—West London Medico-Chirurgical Society; West London Post-Graduate College; West Suffolk County Council, Bury St. Edmunds; Dr. J. D. Wynne, Norwich; Mr. R. O. Ward, Lond.; Mr. E. W. Williams, Clifton.

Communications relating to the editorial business should be addressed exclusively to the Editor of THE LANCET, 423, Strand, London, W.C. 2.